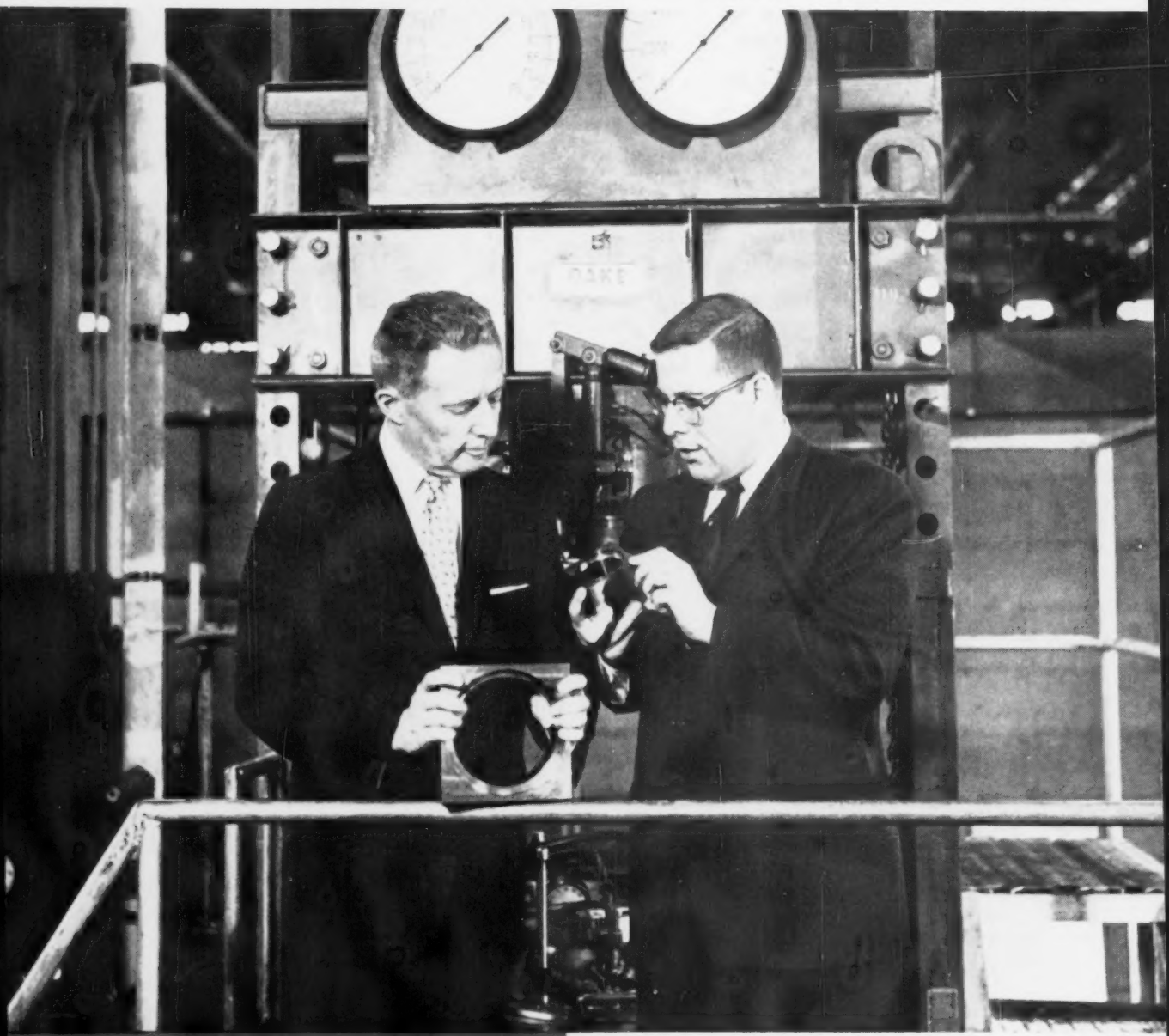
IRON AGE

THE NATIONAL METALWORKING WEEKLY A Chilton Publication MAY 25, 1961



Gene Pyle

★ GE's DeLong and Stuligross Discuss How—

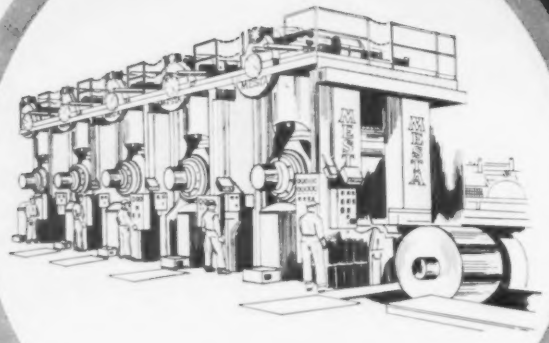
New Metal-Powder Process Makes Parts in Vacuum p. 101

How Business Views Tax Credit p. 71

Spring Brings Out Auto Buyers p. 74

Digest of the Week p. 2-3

MESTA ROLLS



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Digest of the Week in Metalworking

News of the Industry

Tax Credit Plan Runs Into Opposition: Many feel it's not the answer. 71
Tool Bank Plan Under Attack: Used machine dealers call it "fantastic." 73
Weather Warms Up Auto Sales: Car production and inventories increase. 74
How Depressed Area Aid Plan Works: Rules on loans fully explained. 75
What's Ahead for W. German Economy: VW's Nordhoff interviewed. 76
Service Centers Stress Marketing: More customer aid is planned. 79
Short-term Business Outlook Is Bright: But serious problems remain. 80

Engineering-Production Developments

Powder Metallurgy Scores New Goals: Aids atomic power. 101
Vacuum Degassing Handles Openhearth Heats: Lowers oxide inclusions. 104
Remove White Layers From Nitrided Parts: Process solves problem. 106
Dynamic Honing Improves Hydraulic Lines: Gets rid of contamination. 108
Electric Lift Trucks Move Nose Cones: Handling system is foolproof. 111
Semiautomatic Welds Join Railcars: Vapor shield protects weld puddle. 113

Markets and Price Trends

Steel Summary: Moderate, orderly upturn continues for most products. 133
Purchasing Demands Science: More than buying must be studied. 134
Nonferrous: Aluminum orders up, but not as much as hoped. 142
Why Computer Sales Advance: Information-processing booms 89
Machine Tool Makers Plan Ahead: Studies pinpoint coming market needs. 91

Editorial

Kennedy vs. Khrushchev:
This Is a Poor Time for It! 5

Metalworking Newsfront

Business Forecast 7
Metalworking Labor 9
Washington 11
International 13
Techfront 15
Market-Planning Digest 69
Report to Management 85
Spacefront 99
Steel Summary 133

Industry Trends

Automotive 87
West Coast 89
Machine Tools 91
Purchasing 134

Markets and Prices

Price Section 133
Steel Products 136
Ferrous Scrap 138
Nonferrous 142

Departments

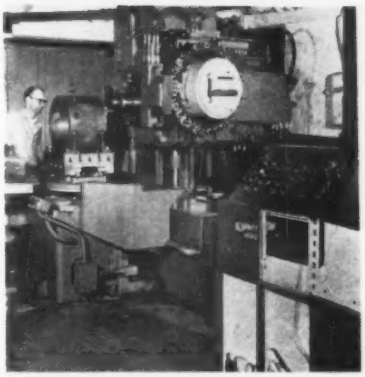
Letters 27
Fatigue Cracks 29
Meetings and Exhibits 31
Industrial Briefs 82
Men in Metalworking 93
New Patents 116
Technical Literature 119
Design Digest 122
New Equipment 128
Clearing House 152

ADVERTISING INDEX ... 151

Special This Week

Powder Metallurgy Yields Pure Parts

A modified vacuum powder-metallurgy process sweeps away long-time barriers to cheap atomic power. Very pleased with end results are General Electric's Henry DeLong, metallurgical products dept. mgr. (left), and project engineer Ralph Stuligross. This process transforms exotic materials into ultra-pure parts. p. 101



Tax Credit Plan Gets Mauled

If President Kennedy had hopes his tax credit plan to spur industrial investment would get a friendly reception, he was wrong. The stream of witnesses testifying at House hearings on the plan was unanimous in its condemnation of the program. p. 71

Interview with Volkswagen's Nordhoff

Professor Heinz Nordhoff, president of Volkswagen, offers a frank analysis of the West Germany economy in an exclusive interview with Managing Editor E. C. Beaudet. Discussed are capital spending, wage trends, tariffs, and buying policies. p. 76

Next Week

QRC Speeds Product Development

Quick Reaction Capability slashes through red tape at Hallicrafters, Inc. Robert Halligan, president, and other top executives explain how it compresses months into weeks, weeks into days, and days into hours to speed development of new products.

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Kennedy vs Khrushchev: This Is a Poor Time for It

Mr. Kennedy is going to learn the hard way. That Messrs. Roosevelt, Truman and Eisenhower learned the futility of summit meetings means nothing to our President.

If he hadn't had the meeting idea before the Cuban fiasco, it would look like he got his advice from the same sources who advised him on that. Maybe he did, at that.

Just what Mr. Kennedy can hope to do at a meeting with that sly old fox Khrushchev would puzzle even a Philadelphia lawyer. But it is more tragic than that. The meeting comes at a time when Mr. K. is feeling his oats—and with reason.

There will be a lot of talk about solidarity and a cry for self-restraint for the benefit of the nation. But that should not preclude the flat statement that millions will wonder where John F. Kennedy has been for the past 15 years.

Mr. K. never would have agreed to a meeting unless his cunning and tricky peasant knowledge of people forecast another tremendous propaganda advantage. And we may be sure he will get it—and again we will get nothing.

Some people argue that Mr. Kennedy will tell Mr. K. that we mean what we say. They believe Mr. Khrushchev will listen while the President tells him we will fight Communism and that he, Mr. K., should not misjudge us. How naive can our governmental advisors be?

Others who do not favor such a meeting believe that our reverses have been so great that this is no time for a meeting. That, too, is beside the point. There is a simple question that should have been asked over and over again.

The question: "What good will such a meeting be?" And the answer is simple: "It will be no good at all."

The Reds understand power only. All Mr. Kennedy can offer is words. Many men went to the Soviet trap before. Does he or his advisors feel that he has something our three previous Presidents did not have? If so, he still has a lot to learn.

Until we have the power and the full and unquestionable support of our allies, we should never have a meeting with the top dictator.

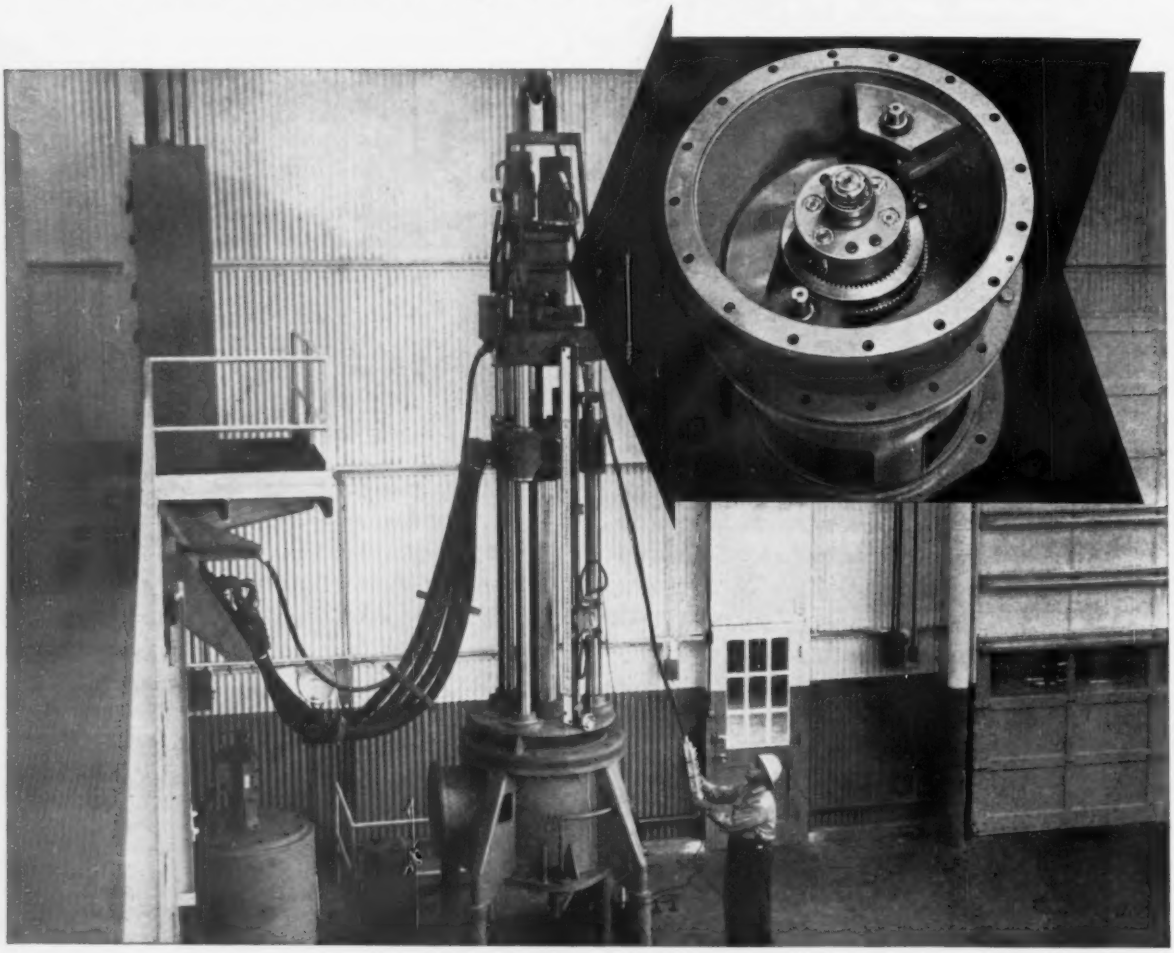
Until Mr. Kennedy really knows what he wants —and how he hopes to get it—a meeting with Mr. K. is folly.

And until the people know what the President wants—and until he leads them forward to it—a meeting with Mr. Khrushchev is the worst form of weakness.

Tom Campbell

Editor-in-Chief

Philadelphia Precision Ground Gearing Increases Sensitivity of New Vacuum Arc Furnace



Philadelphia precision ground gearing is responsible for smoother, more efficient operation of a new consumable electrode vacuum arc melting furnace installed at Standard Steel Works Division of Baldwin-Lima-Hamilton Corporation.

This specially designed differential reduction, planetary gear drive greatly increased the efficiency of the furnace. The old problem of stop-start action with uneven electrode burnoff has been completely eliminated. Now, uniform electrode feed permits arc voltage to be maintained within ±.1 Volt. Electrode burnoff is uniform.

This drive problem is typical of hundreds that have been solved with Philadelphia hardened, precision ground gearing . . . problems where improved gear accuracies have resulted in space and weight savings, higher-speed operation, reduced sound and vibration levels, and longer gear life—all at no increase in cost.

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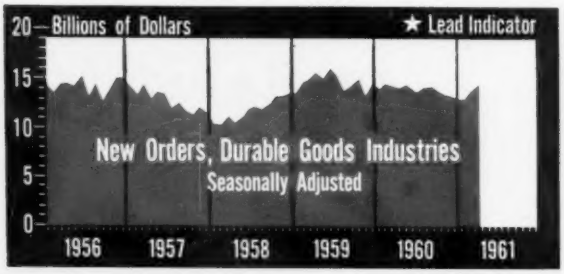
Durable Goods Orders, Sales Up

New orders received by durable goods manufacturers rose to $14.5 billion in April, up $600 million from March. This is the biggest jump scored since the summer of 1960. The data is seasonally adjusted.

Another good sign: New orders increased at a greater



rate than sales. Sales in April rose to $14.2 billion, up from $13.7 billion in March.

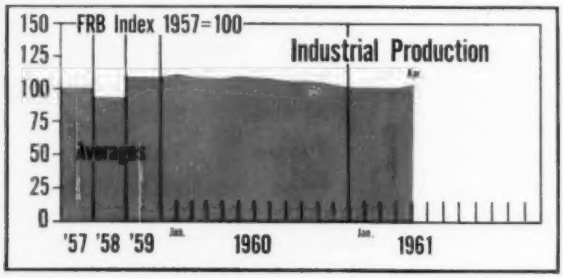
The April rise in both orders and sales was sparked by gains in steel and auto industries. And placement of defense contracts helped in the boost.

The only crossed fingers noted are held by those who are wary of coming bargaining table sessions. But the recovery momentum seems to have enough steam to run over all but sustained strikes—which are unlikely.

Production Gains in April

April industrial production rose to 105 pct of the 1957 average. While 2.5 pct above March, production was still 4 pct below mid-1960.

Stepped-up auto output in April accounted for some of the general rise. Auto assemblies were up 30 pct over March. And steel rose 15 pct.



Other metalworking lines sharing in the gain: Commercial and industrial machinery, trucks, farm equipment, and TV and radio components.

Recovery Pattern Shapes Up

The sharp improvement in the economic picture fits the probability of a "V" type recovery. Some look for a "W" type: A sharp rise followed by a slight setback and that followed by a lasting uptrend.

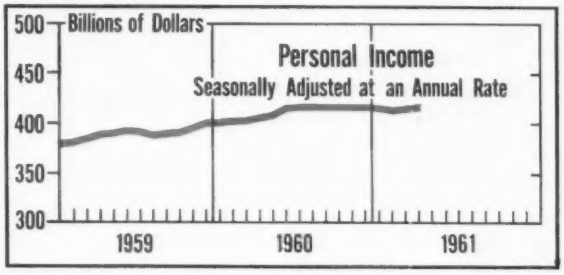
Best guess is that we are in for straight recovery from here on: Sharp now with a little less gain on a percentage basis after the first flush.

Steel and autos have done their part. It now remains for trade, carloadings, oil and gas, and installment buying to take their place in the uptrend. All appear to be poised for a takeoff later in the year.

Personal Income Rises

Increases in the factory workweek and a pickup in employment boosted personal income in April. Income stood at a seasonally adjusted $410.3 billion in April, a gain of $500 million over March.

The gain over March is significant as March income was bloated by over $1.5 billion by advance GI insurance dividends.



Large payroll increases in steel and metalworking industries led in April income gains.

Some incomes had slight falloffs in April. But wages and salary income increases more than made up for these declines. Wages and salaries for April came to $274.3 billion, up from $272.1 billion in March.

The Big Gap: Sales-Profits

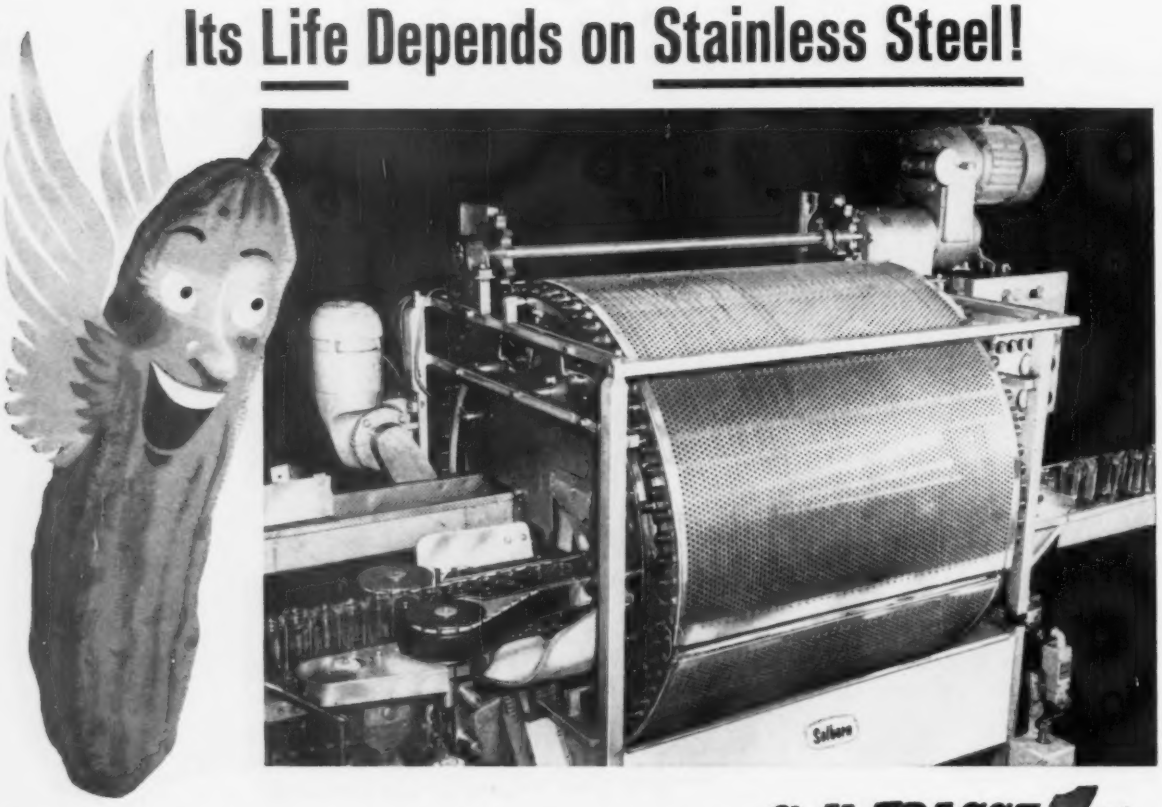
There is a lack of cheer on the part of many top managements about the recovery. This is because they foresee another "profitless prosperity." The short-term cycle wheels are spinning upward now. But the long-term story is one of more and more sales and less and less profits.

In the 1950-60 decade, net sales of U. S. manufacturing companies increased by almost 90 pct. Pre-tax profits on sales declined almost 40 pct. And the forces that shaped this trend are still present.

Companies that hit hard on profitable sales rather than on sheer sales volume will probably make the best overall corporate gains in the "profitless prosperity."

Meet the "Pickle Packer"—

Its Life Depends on Stainless Steel!



Pickles fly when this ingenious "Pickle Packer" goes into action. With unbelievable precision it packs 6,000 a *minute*—fills 18,000 jars an hour ...even guarantees full measure in the bargain. Seven times faster than previous methods...it's far less costly!

Despite corrosive brine, trouble-free operation and long life pose no problem...the "Pickle Packer" is completely made of corrosion resistant stainless steel. Stainless steel protects product purity—is easily cleaned ...meets sanitary codes.

Stainless steel bars, angles, sheets, plates, tubing and pipe are used in the "packer"...yet *every* item is shipped *from stock* by Frasse. Frasse carries every rolled form—in a wide range of sizes and analyses...has a wealth of know-how in applying stainless to *build sales.*

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AFL-CIO: Back Peace At Missile Bases

Organized labor has pledged full cooperation with Administration efforts to insure labor peace at U. S. missile bases.

KENNEDY & GOLDBERG: Unions take pledge.

Spokesmen for the AFL-CIO, though claiming design changes and management mistakes caused missile base delays, agreed to cooperate with President Kennedy and Labor Secretary Goldberg in their plans to end slowdowns on base construction.

Senate investigators have charged that strikes, slowdowns and cost-inflating provisions of union contracts are the cause of the delays. Government officials say construction is about six months behind schedule.

ILA: Bows Out of Transportation Pact

Teamsters Union boss James R. Hoffa received a setback less than a week after he launched his latest move to become czar of the transportation industry.

Less than two weeks ago the Teamsters, International Longshoremen's Assn., and National Maritime Union announced a mutual assistance pact. It was aimed at backing the NMU in its contract talks with 74 companies operating nearly 600 deep-water ships.

Less than a week later, the ILA has pulled out. It was either that or get booted out of the AFL-CIO—again. It happened once before, in 1953, and the Longshoremen were only readmitted in 1959—on two years probation. The probation isn't up yet.

The Teamsters were bounced in 1957 and aren't back yet—nor are they really interested in rejoining. But Mr. Hoffa had hopes of at least a modest beginning toward an all-inclusive transportation union.

The same three union leaders tried to forge a Conference on Transportation Unity in 1958. At that time, about 50 unions with about 3.5 million members employed in land, sea and air transportation figured in the scheme.

Challenge Need For Federal UC Standards

Need for Federal minimum unemployment benefit standards is challenged by Unemployment Benefit Advisors, Inc. Overall, the states have done a good job of keeping benefits abreast of wages, says U.B.A.

Some items cited: Benefits have risen 44 pct faster than the cost-of-living since 1939. About 60 pct of those receiving benefits now receive half or more of gross wages. In the past two years, 21 states have upped weekly benefits and now pay for longer periods.

Get Ready for Next Contract

A panel of top labor negotiators, speaking at an American Management Assn. meeting in Chicago, said that the time to plan for your next contract negotiation is **"while the ink is still drying on this year's agreement."**

They offered this advice on how to go about it:

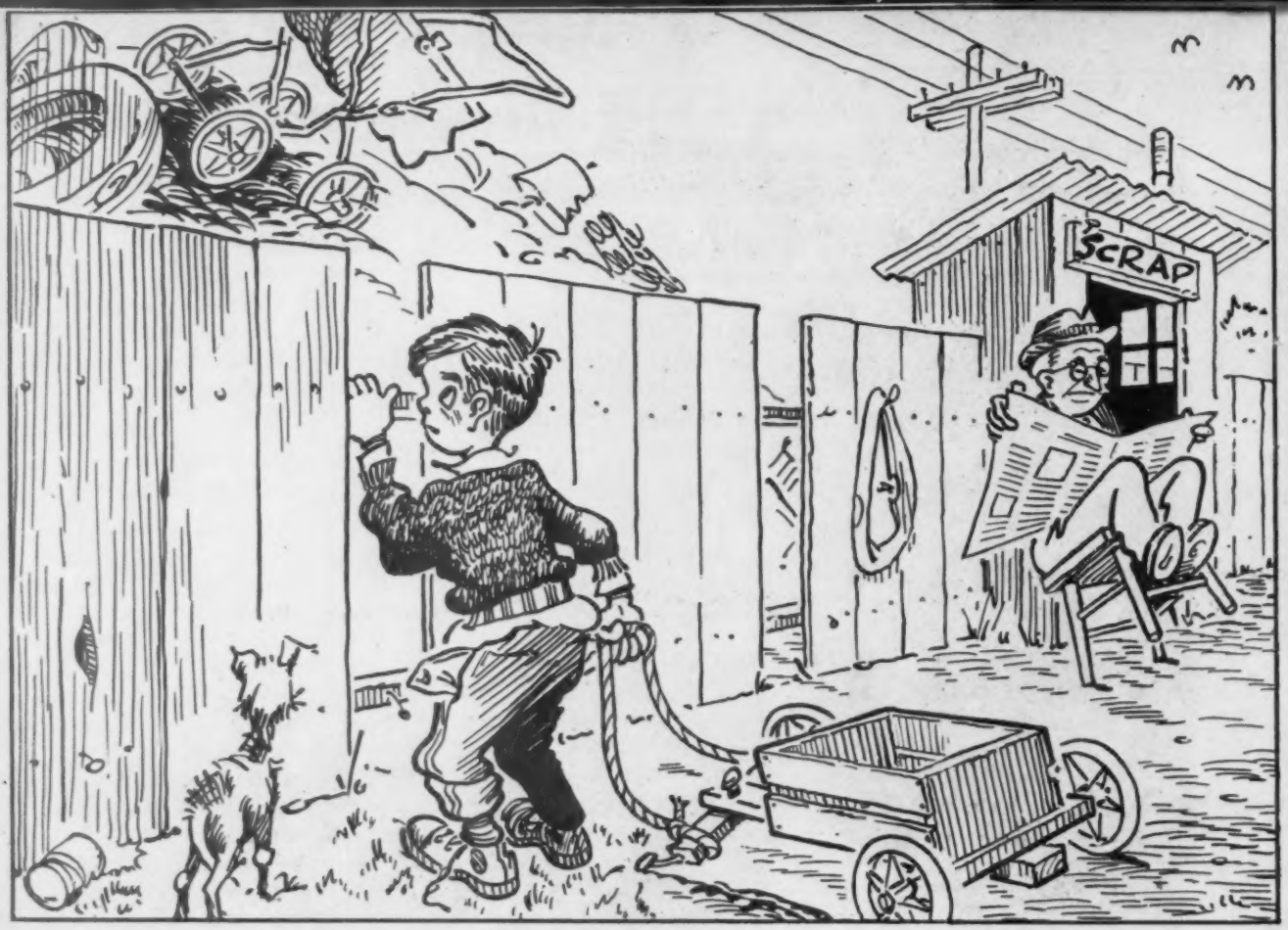
Overhaul worker-management communications. Decide **what** you want to communicate **before** you decide **how.** Learn to concentrate on these objectives in daily contacts as well as through your communications program.

Begin deciding management's demands now. Foremen are an excellent source of what's needed in the contract. So are cost accounting, the industrial engineering department, and the plant manager.

Back every demand with exhaustive data. Such counterattacks have already revised seniority plans, incentive plans, and cut cost of time spent on union business.

Organize your team in depth. Build it around a man with legal training who knows rapidly changing labor laws. Backstop him with trained men in labor relations, production, and finance. Drill the team in all data that affects corporate costs.

Backstop your demands. Have several plans for achieving a demand. Use your revamped communications methods to point out areas in which the company is weak. Tie the demands in with the objectives to be attained in your communications program.



REMEMBER WHEN . . .

You Couldn't Afford Scrap?

You still can't! As a manufacturer, one of the primary problems you face today is probably the reduction of scrap. Many manufacturers are using *American* machine tools to lick the scrap problem.

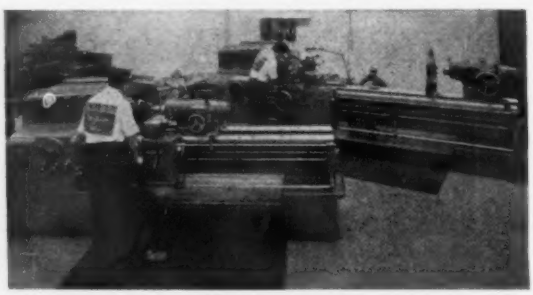
Take the United States Beryllium Corporation, for example . . .

To produce 9" diameter memory drums for computers from the light but strong space-age metal, beryllium, requires extreme precision. Specifications for these drums called for lathes which would hold flatness, roundness, squareness and size to .0001" or less. Because the raw material is extremely expensive, scrap would be disastrous. Anything less than the best lathe could not be considered.

That's why the United States Beryllium Corporation plant at Inglewood, California chose American Lathes. According to Mr. Frank Hevrdejs, Vice President of U. S. Beryllium, their Americans are turning perfectly round within .000050" to help produce these beryllium memory drums with an absolute minimum of scrap.

"Impossible" jobs are routine for American Lathes. Thanks to their carefully engineered rugged design, they keep on performing their accurate jobs year after year in tool room, maintenance and production applications.

If you have a scrap problem, contact your American distributor. Learn how you can secure American Lathes and American Radial Drills on "Toolease," our popular leasing plan. Or, write Section 164 at the address below. Ask for bulletins 116 and 801.



American Lathes perform precision turning in the "hospital clean" shops of the United States Beryllium Corporation.

THE AMERICAN TOOL WORKS COMPANY

PEARL STREET AT EGGLESTON AVENUE • CINCINNATI 2, OHIO

★Public Works: Key to Jobs?

A "new" public works program to pour construction funds into the economy is in the works.

The program would be used to spur a quicker upturn in the nation's business if present unemployment trends continue. It would be designed to open more jobs in industry.

One of its key features is a multimillion dollar community facilities bill to help finance construction of local water, sewerage, housing and other improvements.

The Administration considers a "new" public works program a good means of pumping quickly spendable funds into the economy. But the Administration has had to consider alternatives, also.

The alternatives include stepped up spending for defense and space programs. Also included are proposals for Federal grants for retraining workers and creation of a youth conservation corps.

All the "New Deal" type projects are pending before Congress. They would answer critics who say the President's present anti-recession program is inadequate for a fast cut in unemployment.

"The strong liberal factions in Congress will push for the public works program. Frontrunner in legislation of this type is a bill sponsored by Sen. Joseph S. Clark (D., Pa.). Sen. Clark's bill would authorize $1 billion for public works.

The Clark Bill provides $500 million in Federal grants to local communities, with discretionary authority for the President to spend another $500 million if high unemployment persists.

■ Identical Bids Face Tougher Laws

A harsher crackdown on identical bidding may come out of Congress. Lawmakers are considering legislation to stop companies from submitting identical bids to the Federal government.

The bill, now before Congress, closely follows President Kennedy's order that all identical bids submitted to the government be given publicity by the Justice Dept.

It has Justice Dept. backing. Lee Loevinger, head of the Department's antitrust division, says the proposal would be an effective deterrent to collusive bidding.

However, some Congressmen don't think it goes far enough. They are calling for stricter criminal prosecution for collusive identical bidding. And they want to put the burden of proof on companies. A company would have to prove there was no collusion if it submitted a bid identical to a competitor's.

■ Kennedy May Wield Bigger Labor Stick

Legislation to give the President stronger Congressional support for intervention in industry wage and price policies is now before Congress.

A Republican Congressman, Rep. Walter H. Judd (R., Minn.), introduced a bill to help the Democratic Administration reach its announced goal of stable prices. The bill would specify that relative price stability is an explicit aim of Federal economic policy.

Rep. Judd says: "In recent years the increased earnings resulting from improved machinery, techniques, and skills have been devoted almost solely to increasing wages to the workers and profits to the owners."

The Congressman says the most beneficial use of increased productivity should be price reductions.

■ Hodges Pushes For Higher Business Ethics

A code of ethics for American business is being drafted by a group of U.S. clergymen, businessmen, teachers and editors.

The group, known as the Ethics Advisory Council, met in Washington recently at the invitation of

HODGES: Moral precepts.

Commerce Secretary Luther Hodges and agreed to take on the job of drafting a code.

Mr. Hodges says he expects the council to draw up a single code for all business or different codes for different industries "that would be guidelines for them." He also hopes the council will produce a more widespread awareness throughout the nation of the moral as well as legal precepts for businessmen.

AUTOMATIC CAMSHAFT HARDENING

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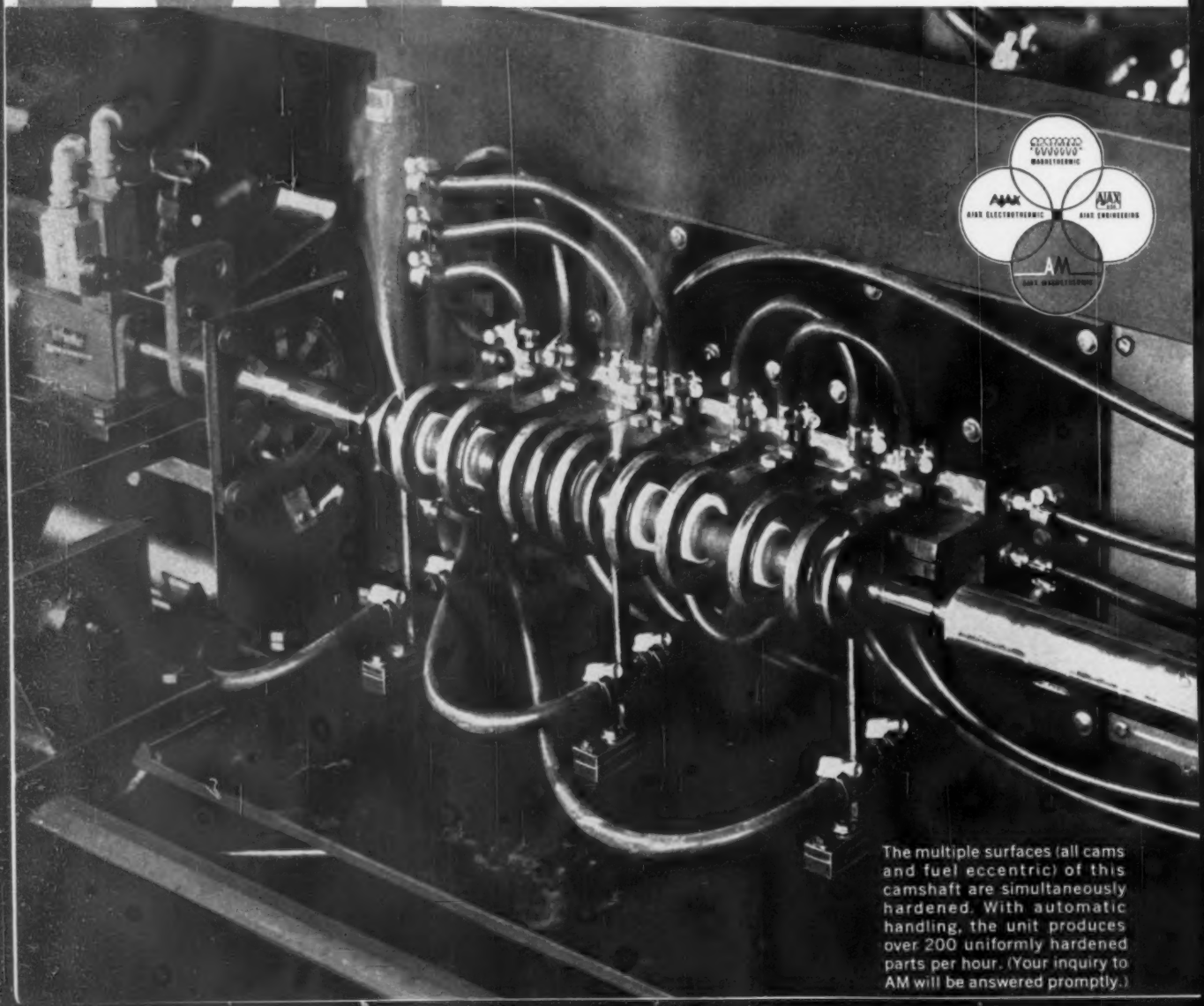


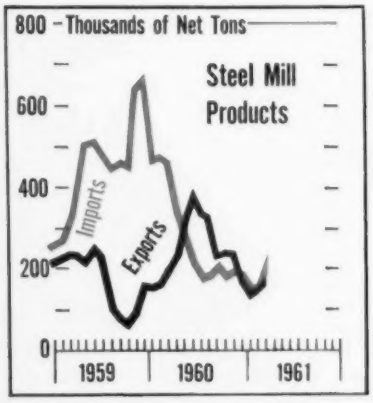
The multiple surfaces (all cams and fuel eccentric) of this camshaft are simultaneously hardened. With automatic handling, the unit produces over 200 uniformly hardened parts per hour. (Your inquiry to AM will be answered promptly.)

Steel Imports, Exports Again Show Gain

Imports and exports of steel mill products rose in March, according to the latest figures just released by the Dept. of Commerce.

Imports totaled 211,000 net tons in March. That's an increase of 59,000 tons over February, but it's less than half the tonnage of March 1960 when imports were still affected by the steel strike.

Exports in March totaled 168,000 tons—a gain of 21,000 tons



over February. But tonnage was 35,000 tons off the March 1960 figure.

The sharp gain in imports of foreign steel is probably due to delayed deliveries from Belgium, the principal supplier of steel to the U. S. That nation just recently recovered from a general strike in December and January.

Plates and rails were largely responsible for the rise in exports during March.

Air Cargo Rates Might Be Slashed

Air cargo rates might be slashed up to 62 pct beginning July 1. After almost nine months of disagreement, airlines which cross the North Atlantic recently reached a tentative agreement in Montreal.

The agreement covers the type of tariff and rates desired by the airlines. Current rates expire July 1. Without a mutual agreement among the airlines, a rate war could be staged.

The proposed new rates are subject to government approval. The airlines plan to introduce seven weight breaks under the general rate.

A VW Record

Volkswagen sales in the U. S. hit a record high for the automaker in March. VW of America says 18,195 vehicles were sold in March. It's described as "The highest monthly total in VW's sales history."

Ghana Aluminum Plan Gathers Momentum

Progress, though slow, continues on the $346 million Ghana aluminum project supported by five U. S. and Canadian aluminum companies.

An Italian consortium has been given the basic construction contract for a dam across the Volta River. This is the first phase of the hydroelectric project designed to spur Ghana's industrial development. The $16.8 million contract went to Impresit-Girola - Lodigiani of Milano and E. Recchi, Torino.

Under terms of an agreement signed November 17, the five aluminum makers (known as Volta Aluminum Co., Ltd.) will build a $178 million aluminum smelter. Ghana, however, must build a $168 million dam across the river to provide the hydroelectric power.

Deadline for the project under the agreement, is 1966.

New Export Guaranty Corporation Proposed

A Federally - chartered export credit guaranty group, backed with private capital, is being supported in Congress. Rep. Abraham J. Multer (D., N. Y.) and William A. Widnall (R., N. J.) introduced a bill to establish an American Export Credits Guaranty Corp.

The Congressmen say such a corporation would guarantee all kinds of exports against normal commercial failures of foreign buyers to meet the terms of payment.

Red Subsidy Behind New Lathe?

British machine tool makers are concerned at the implications in price and quality of a new Russian center lathe. The machine, probably the first of its type to reach England, is now in operation in Yorkshire.

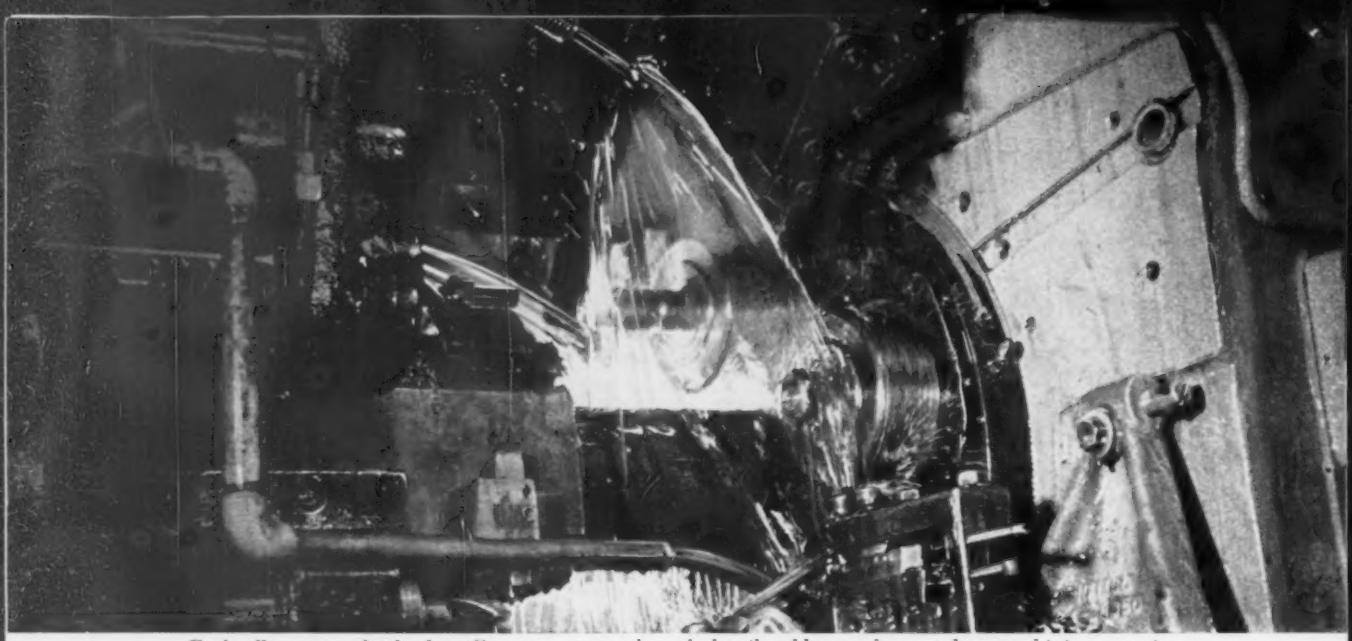
The Krasni Proletari IK 62 lathe was bought for $4800—including an $800 duty. Some British manufacturers described the price as "ridiculous" after seeing the machine in operation. The corresponding British lathe sells for $8400.

The company which bought the tool says it is "Absolutely first class." They feel it represents a major threat to the machine tool industry. Many believe production of the lathe has been heavily subsidised.

Belgium's Auto Role

Belgium's importance in the European auto outlook continues to grow. Porsche, the German automaker, is turning over convertible production to Establissements d'Ieteren in Brussels.

Also, Leyland Motors, Ltd. has joined with Brossel Freres, S.A. of Belgium to build 200-hp trucks.



Garia oils are completely clear. Operators can see through the oil and keep a close watch on machining operation.

CUTTING:

Shell puts heavy-duty properties into transparent cutting oils that lengthen tool life three significant ways

Today, Shell's new Garia® Oils are helping machine shops improve metal finish and prolong tool life—even in heavy-duty cutting. And because Garia is transparent, operators can see the work at all times.

Read how Shell Garia Oils can reduce rejects, cut maintenance and overhead costs in your shop.

UNTIL RECENTLY, most heavy-duty cutting oils were opaque fluids which obscured the work.

Shell scientists took up the problem. They experimented with different formulae until they found the *exact combination* that retained the necessary properties—but did not seriously darken the oil.

Now Shell Garia Oils have the transparency of light mineral oils and the rugged qualities of heavy-duty oils.

With Shell's improved Garia Oils, operators can see through the oil film. Work can be inspected more easily.

Garia Oils prolong tool life in three key ways:

1. Garia Oils help prevent metal pick-up. Shell Garia Oils form a more effective film between the work and the tool. This provides better anti-weld protection, and helps prevent metal pick-up on tools.

2. Garia Oils help keep work cooler. Even with high-speed cutting, the metal stays cool.

Cooling helps extend tool life, and helps assure a better finish on the work. Operating costs are lower too.

3. Garia Oils wet faster. They reach the tool point rapidly, cover newly exposed surfaces quickly.

Compact range

Today's range of Garia Oils covers every kind of metal cutting operation.

Result: you do not have to carry large cutting oil inventories. You can do more jobs with fewer Garia Oils.

For all the facts, see your Shell Industrial Products Representative. Or write: Shell Oil Company, 50 West 50th Street, New York 20, N. Y.

SHELL

A BULLETIN FROM SHELL
—where 1,997 scientists are working to provide better products for industry

Wider Welding Scope

New apparatus and techniques have been developed which will widen the scope of high-frequency resistance welding. In the past, this process has been restricted largely to the fabrication of tubing. With improved positioning methods, as many as eight carbon-steel and stainless-steel strips have been welded edgewise to a small diameter tube at speeds of 160 fpm.

Ceramic Bonds Circuits

A 97-pct alumina base yields high-reliability printed circuits with a fixed molybdenum-manganese circuit pattern. Typical of these new printed circuits is a 0.06-in. thick rectangle that measures 2½ x 5 in. It provides 42 mounting-component slots and three holes at each end for mounting the circuitry. This printed circuit can't be marred without destroying the ceramic. It withstands 20,000 psi and heats up to 1300°F.

Concrete Machine Tools

The Russians use reinforced concrete to make machine-tool parts. These parts include planer beds and uprights. To prevent surface damage, all concrete parts are housed in thin steel-sheet casings. Russian engineers claim this method reduces machine-tool manufacturing time by about 50 pct. It also saves many tons of steel.

Aluminum From India?

Although aluminum is the youngest of the major nonferrous metals, in 70 years it has moved into a world-wide industrial position second only to steel. Present aluminum demands in India are 45,000-50,000 tons a year. By 1965-66, the New Delhi Ministry of Commerce expects aluminum demands to reach 150,000 tons per year. India's aluminum-export picture also looks promising.

Improves Auto Brakes

Powdered-metal brake linings for passenger cars will soon make their debut. The prime feature of these linings is that they're made entirely of powdered metal. It's bonded directly on the brake shoes without using any asbestos or asbestos-metal combinations. Advantages include: Less pedal pressure, faster stops, longer lining life, better heat dissipation, no squeaking and a reduction in the number of adjustments needed.

How to Shape Hard Steel

Using diamond cutting tools, a circular-indexing unit machines complex ferrous-metal shapes. This completely-automatic unit drills, reams and taps hard-to-cut parts. All tools are straight-shank types, impregnated with diamond chips. The diamonds in a special grinding head perform various facing operations. Current interest in this equipment centers on electronic applications.

Quick Quench Aluminum

High-velocity streams of air-water mist prevent self-age hardening in quenching extruded aluminum. A stream of cold air and fine water-vapor mist is directed on each extrusion as it leaves the die. By changing the molecular structure of the metal, the cold mist boosts tensile properties. Many U. S. extruders are adopting the new process. It's also attracting a lot of foreign interest.

Coatings Resist Wear

Potassium cyanide and potassium cyanate serve as the main ingredients in a nitriding-type salt bath. Decomposition of the molten salts in contact with ferrous metals liberates carbon and nitrogen. The carbon forms iron carbides. These carbides act as nuclei in producing tough, ductile coatings on ferrous-metal parts.

Refractory-Metal Foams

It's now possible to make non-oxidic refractory foams with controlled pore diameters. By varying the amount of resins and solvents used to generate these foams, final structures can be tailored to meet desired strength, density and pore-spacing needs. The following materials have been prepared as non-oxidic foams: Carbides of titanium, tungsten, moylbdenum, tantalum and columbium; borides of titanium and of zirconium; and silicides of tungsten and molybdenum.

American Hoist

SAVES SIX HOURS PER WELDMENT

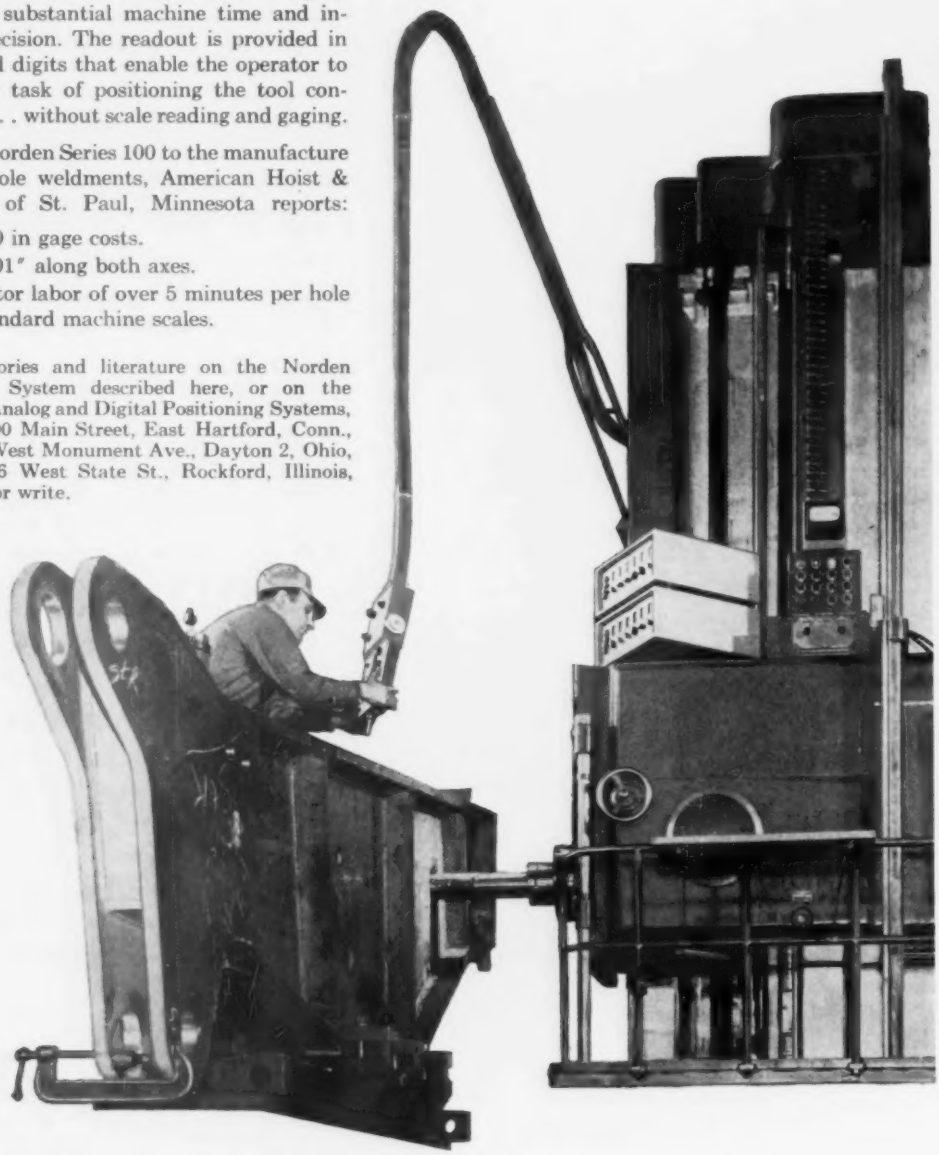
with Norden's Series 100 Modumatic Position Display System

American Hoist's costly, complex weldment structures must be precision bored along both sides of their 16-foot length. Equipping their 7″ Gray Boring Mill with two of Norden's Series 100 Modumatic Display Systems has saved substantial machine time and increased product precision. The readout is provided in six large illuminated digits that enable the operator to accomplish the key task of positioning the tool confidently, smoothly . . . without scale reading and gaging.

In applying the Norden Series 100 to the manufacture of these large 52-hole weldments, American Hoist & Derrick Company of St. Paul, Minnesota reports:

- Savings of $2,000 in gage costs.
- Accuracy to ±.001″ along both axes.
- Savings in operator labor of over 5 minutes per hole location over standard machine scales.

For other case histories and literature on the Norden Modumatic Display System described here, or on the Norden Modumatic Analog and Digital Positioning Systems, contact Norden at 400 Main Street, East Hartford, Conn., JAckson 8-4811; 11 West Monument Ave., Dayton 2, Ohio, BAldwin 8-4481; 206 West State St., Rockford, Illinois, WOodland 5-1891—or write.



NORDEN division of **UNITED AIRCRAFT CORPORATION**

DATA SYSTEMS DEPARTMENT
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BEVEL GEARS FORGED A NEW WAY!

Now... by our unique combination of specialized Rolling and Drop Forging, Milwaukee Forge offers quality Bevel Gears as you want them... when you want them!

Our method will be of interest to you if your requirements fit the following ranges:

Forged Weight.... 30 lbs. to 100 lbs.
Inside Diameter.....6" to 13"
Outside Diameter.....11" to 18"
Quantity Runs.....50 to 5000

MF

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Blast cleaning time cut in half breakage eliminated with spinner hanger cabinet

Castings which could not withstand tumbling action are blast cleaned quickly and safely in this versatile Wheelabrator Spinner Hanger Cabinet at Greenlee Bros. & Co.

A demonstration of WHEELABRATOR'S

VITAL VALUES

Although this Wheelabrator Spinner Hanger Cabinet has eliminated the problem of breakage of high tensile gray iron castings which were not suitable for batch mill cleaning, the big savings have come in reduced cleaning time. Blast times have been cut 50% by the efficient exposure of all surfaces to the blast of the two Wheelabrator units. With this versatile Wheelabrator, this foundry now cleans in 6 hours tonnage equal to their former 12-hour output. Abrasive and parts costs also are proportionately lower. Savings like these are vital to operating efficiency and profits—and are the heart of the values you get from Wheelabrator equipment and services. Write for complete information.

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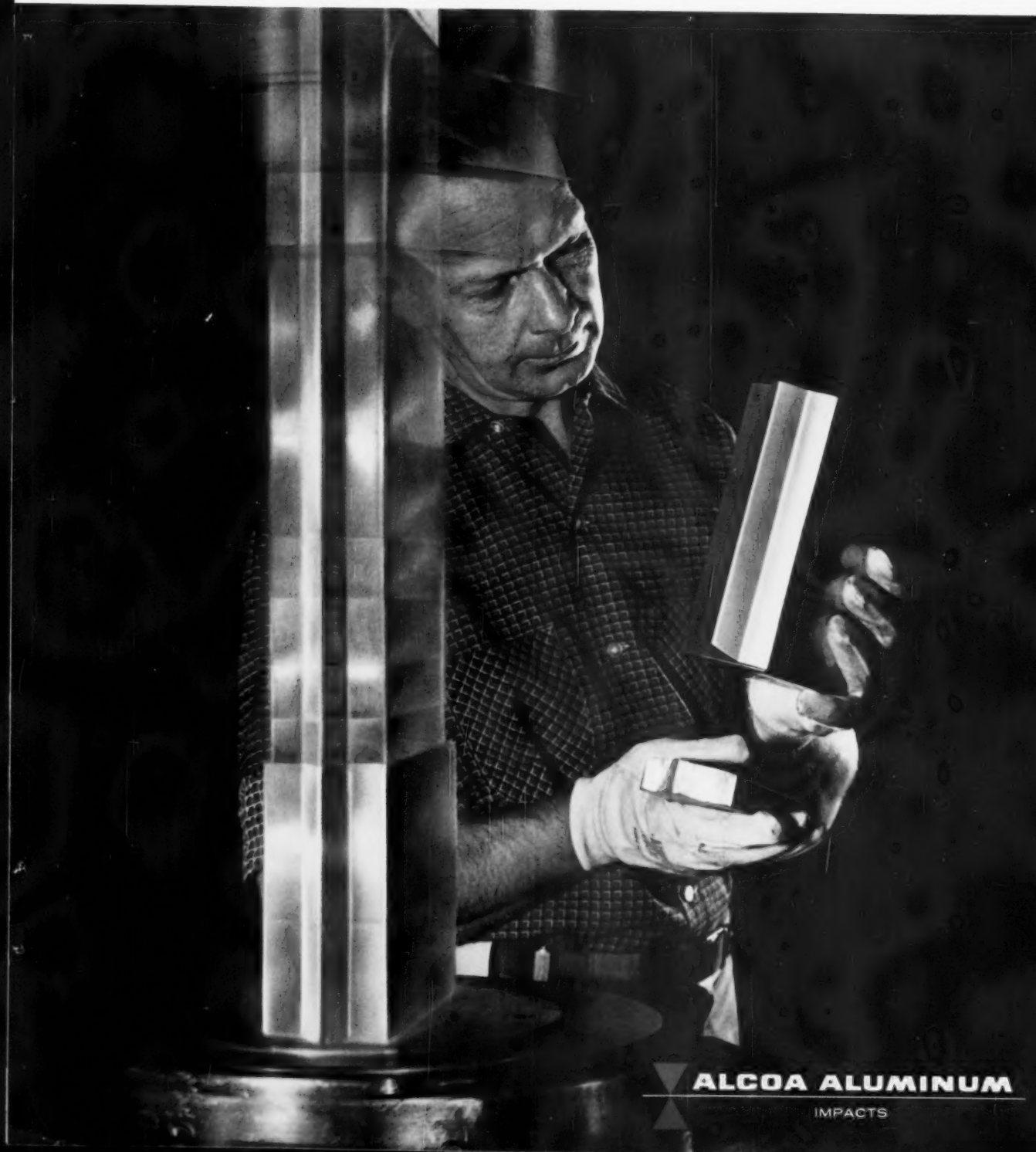
A subsidiary of Bell Intercontinental Corp.

When an impact press spawns a coffeemaker in 1/50 sec...



ALCOA ALUMINUM

IMPACTS

When an impact press spawns a coffeemaker in 1/50 sec... # *that's Alcoa Total Ability at work!*

Quicker than you can wink, an impact press can give birth to a gleaming coffeemaker body, a ribbed flashlight case or a sleek missile shell. In fact, almost *any* can- or tube-shaped part with one end closed can be churned out in 1/50 to 1/100 of a second . . . in one piece.

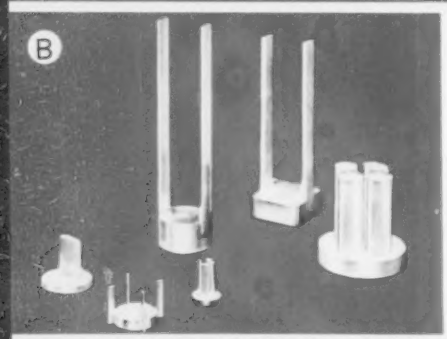
The part can be round, oval, square or rectangular—even polygonal. Hollow or solid or both. With variable diameters up to a foot across. Having internal or external ribs, bosses, splines or flutes. As small as a thimble or chest-high. With the bottom as thick as you like, flanged, shaped like a cup or any other configuration. Finally, in any fantastically diverse combination of these.

Alcoa, who introduced impacts to this country right after World War I, can tell you quite a lot about them. Which alloy to use (it may be a powder!), where to beef them up, and, of course, how to save money.

Or perhaps your problem would be better solved by casting, forging or other fabricating techniques. In any case, *Alcoa's Total Ability* will help you choose the most economical method. Tell us your needs. Simply get in touch with your nearest Alcoa sales office, or write Aluminum Company of America, 855-S Alcoa Building, Pittsburgh 19, Pa.

ALCOA ALUMINUM

IMPACTS



A. Prototypes for coffeemaker bodies

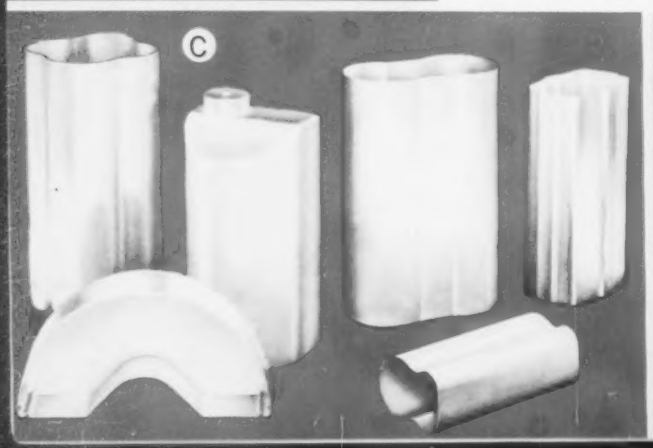
B. Precision solid impact specialties

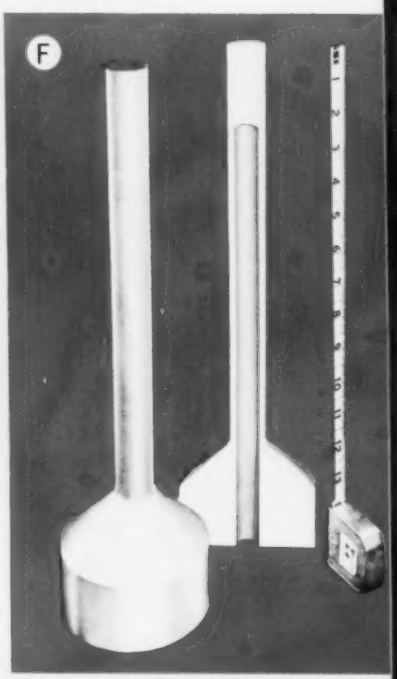
C. Special cross-sectional shapes

D. Double-walled can with external fins

E. Cigarette lighter bodies

F. Machining blank for missile piston





THE LOWER-COST FAN

FOR RUGGED SERVICE!

- **for handling heavy dust loadings and abrasive materials.**
- **for induced draft on industrial and power plant service.**
- **choice of three wheels to meet your requirements.**
- **available with inlet vanes or open inlet.**

The 'Buffalo' Type CR Radial Wheel Fan embodies many quality features found only in the finest 'Buffalo' ventilating and draft fans.

Full inlet-to-duct streamlining minimizes abrasive effect and provides stable, efficient performance. The streamlined housing, the curved inlet bell and inlet wheel flange, the smoothly diverging outlet . . . are the same as those in our well-known BLH and airfoil lines. A special tapered inlet box assures smooth entry.

Long-Life CR construction includes heavy-gauge reinforced steel plate housings and inlet boxes with air-tight access doors; heavy-duty self-aligning sleeve or water-cooled bearings; and shafts sized to run well below critical speed and ground to a close fit on the thrust bearing.

A choice of three wheels of varying widths permits exact matching to your pressure-volume requirements with minimum driving horsepower.

For first-cost savings and continued low-cost performance on many severe services, there is no better buy than the 'Buffalo' Type CR Fan. Write for Bulletin FD-205.

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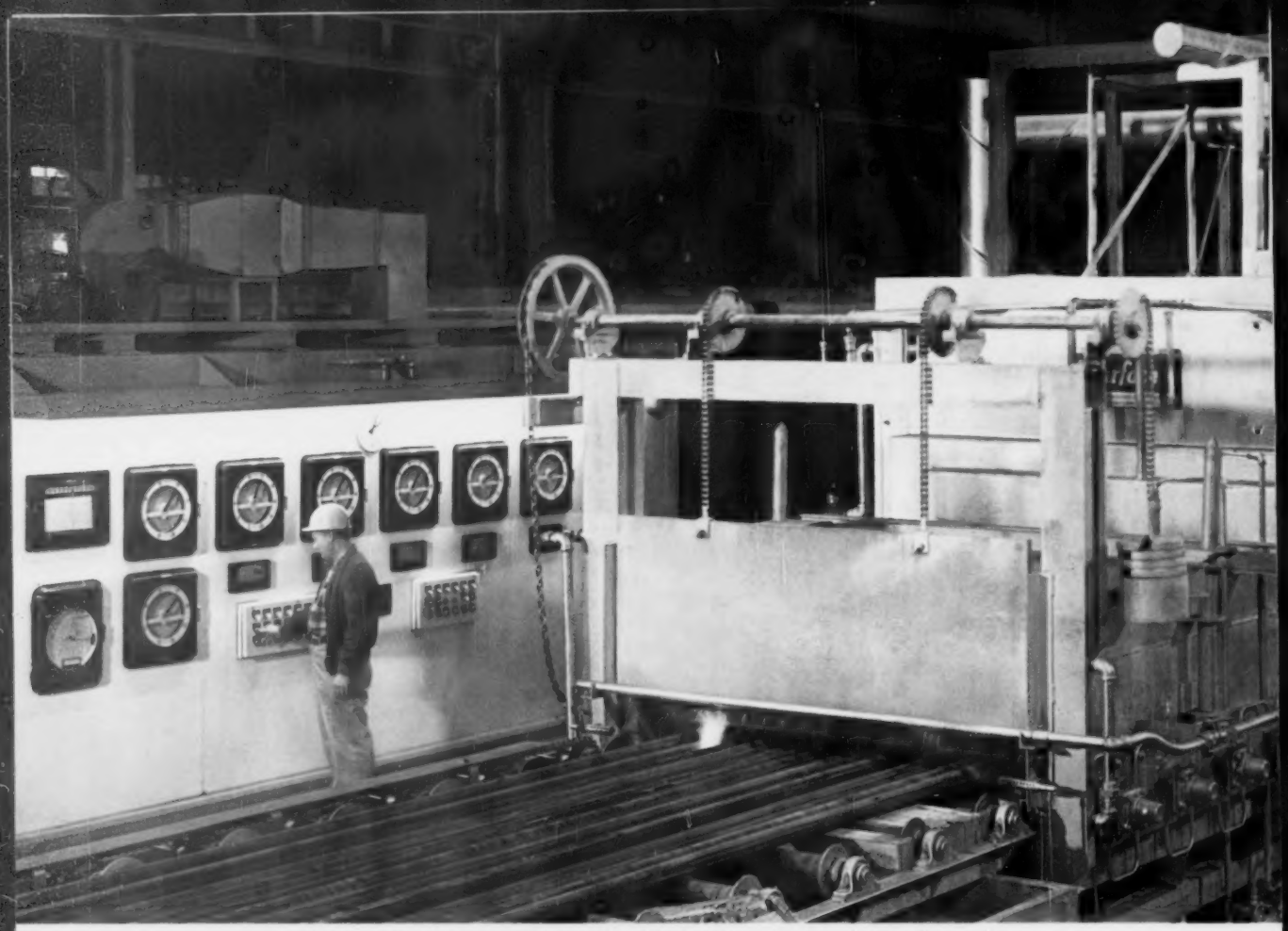


Carbon-restored bars emerge from controlled atmosphere furnace prior to cold drawing.

J&L announces industry's most modern controlled atmosphere furnace for cold finished bars

This new continuous controlled atmosphere furnace is the latest and most important addition to J&L's wide range of heat-treating facilities for cold finished bars. It makes possible a major increase in production of accurately and uniformly heat-treated cold finished bars – so important to producers of finished parts, who depend upon consistent properties throughout the bar, from bar to bar, and from shipment to shipment. The new furnace provides extremely accurate–yet flexible–control of heating and cooling. Flexibility is made possible by the division of the furnace into several automatically controlled chambers. Bars can thus be treated to match exactly each user's requirements for strength, hardness, and structure. These characteristics can be reproduced throughout different lots of steel. A principal function of the new furnace is carbon restoration annealing; other thermal treatments include bright annealing, spheroidize annealing, and normalizing.

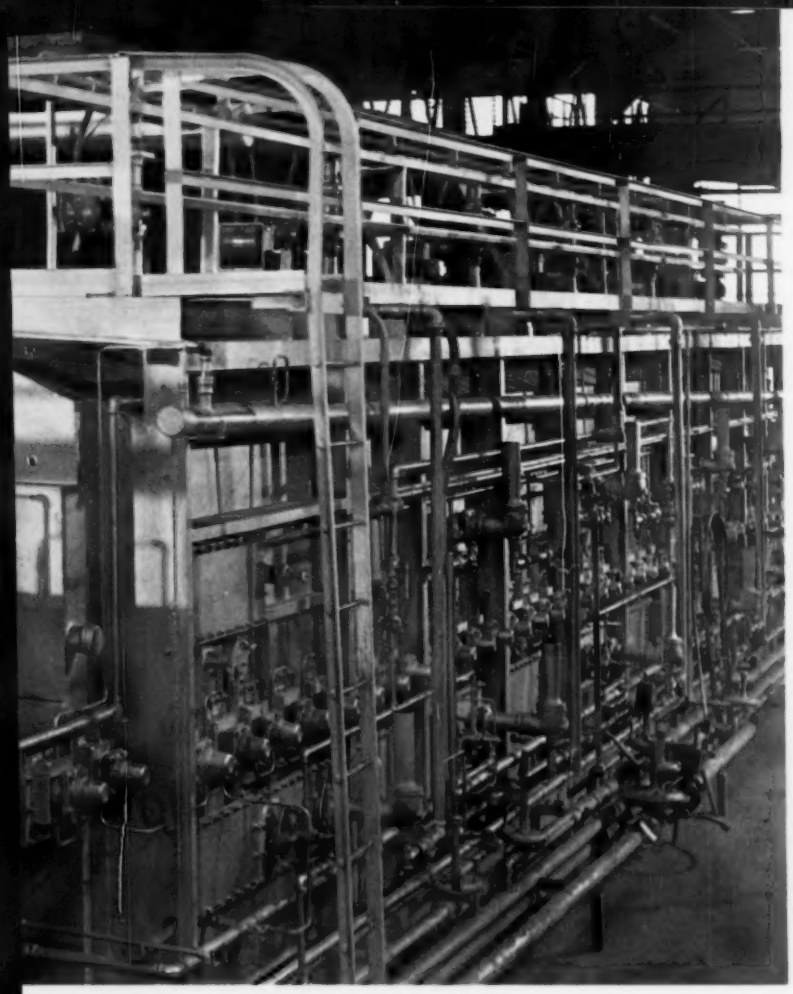
Steel

This Steelmark identifies products made of steel. Place this mark on your products. And — look for it when you buy.

Jones & Laughlin Steel Corporation

3 Gateway Center, Pittsburgh 30, Pennsylvania

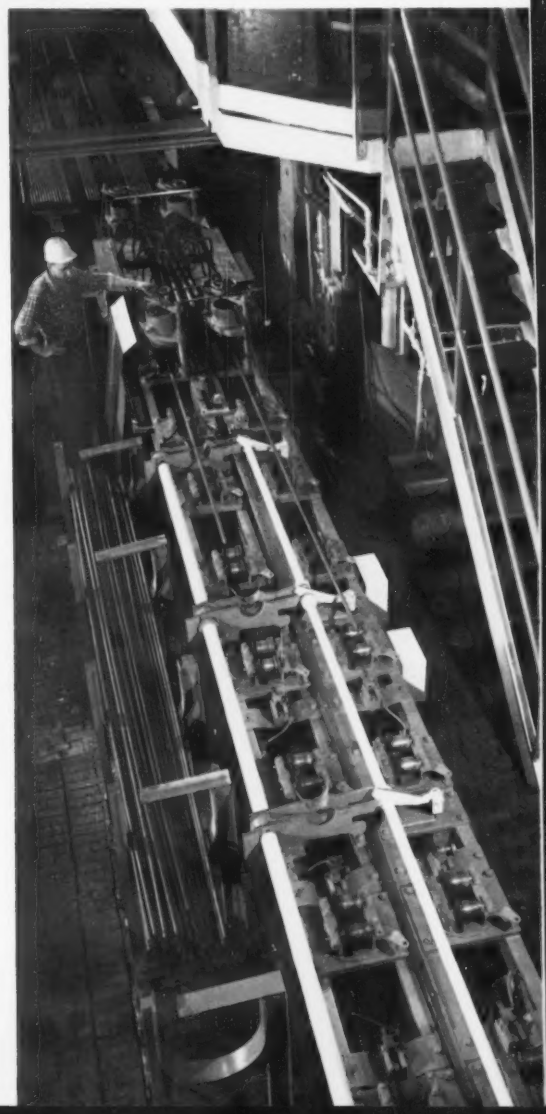
J&L STEEL



This new continuous controlled atmosphere furnace gives J&L greatly enlarged capacity for precision heat treatment of cold finished bar stock. Automatic control of furnace atmosphere, heating, and cooling results in a very uniform structure for the annealed bars.

Electreat is an exclusive J&L method of heat-treating cold finished bars by exceptionally accurate control of heating, quenching, and tempering. Individual bars are fed continuously through an induction coil, then quickly cooled and tempered to obtain desired mechanical properties or hardness. Electreat gives a high-strength bar with superior ductility and uniform hardness. Improved notch toughness enables parts to withstand shock loads in service; provides greater strength than conventionally heat-treated carbon steel at lower cost than alloy steel for many products.

New Holland Machine Company saves on drive shaft cost. By selecting J&L's Electreat C-1144 cold finished bars for the feeder drive shaft of a new hay baler, New Holland Machine Company met high standards for strength while saving money on the cost of the part. Electreat's high minimum yield strength (120,000 p.s.i. required in this case) and uniform hardness eliminated the need to use a larger diameter carbon steel shaft or an expensive alloy steel. Due to the high yield strength and uniform quality of Electreat, New Holland reports very satisfactory field performance from their shafts.



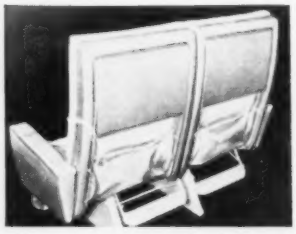
For United Air Lines' Jets,

3M ADHESIVE'S "INSTANT" BOND STRENGTH PUTS SCULPTURED SEATS TOGETHER—FAST!

3M Brand Adhesive EC-1357 builds high bond strength practically instantaneously between leather covering and aluminum frames so that the leather can be immediately formed to the special sculptured design of the seats for United Air Lines' jets. As a result, Aerotherm Division of Aerotec Industries Inc., Bantam, Conn., has achieved production-line speed and economy in making the seats.

In production, EC-1357 is applied to aluminum back and side frames up to a week before actual bonding, then solvent-reactivated, for flexible scheduling. Areas of pre-cut leather are brush-coated with EC-1357; the leather is thoroughly soaked; adhesive surfaces are wiped free of water, and a second coat of EC-1357 is applied. Production line fixtures then apply pressure to the leather-to-aluminum bonds, and because of rapid strength build-up, the leather can be immediately pulled into proper contour.

How can 3M adhesives speed your production? EC-1357 is one of hundreds of adhesives developed by 3M research to solve industrial fastening, coating and sealing problems. Call the nearby 3M Field Engineer. Or write AC&S Division, 3M Co., Dept. SBQ-51, St. Paul 6, Minn.



Fast strength build-up of 3M Brand Adhesive EC-1357 permits immediate form-fitting of leather after it's bonded to aluminum seat frame.

ADHESIVES, COATINGS AND SEALERS DIVISION

MINNESOTA MINING AND MANUFACTURING COMPANY

. . . WHERE RESEARCH IS THE KEY TO TOMORROW

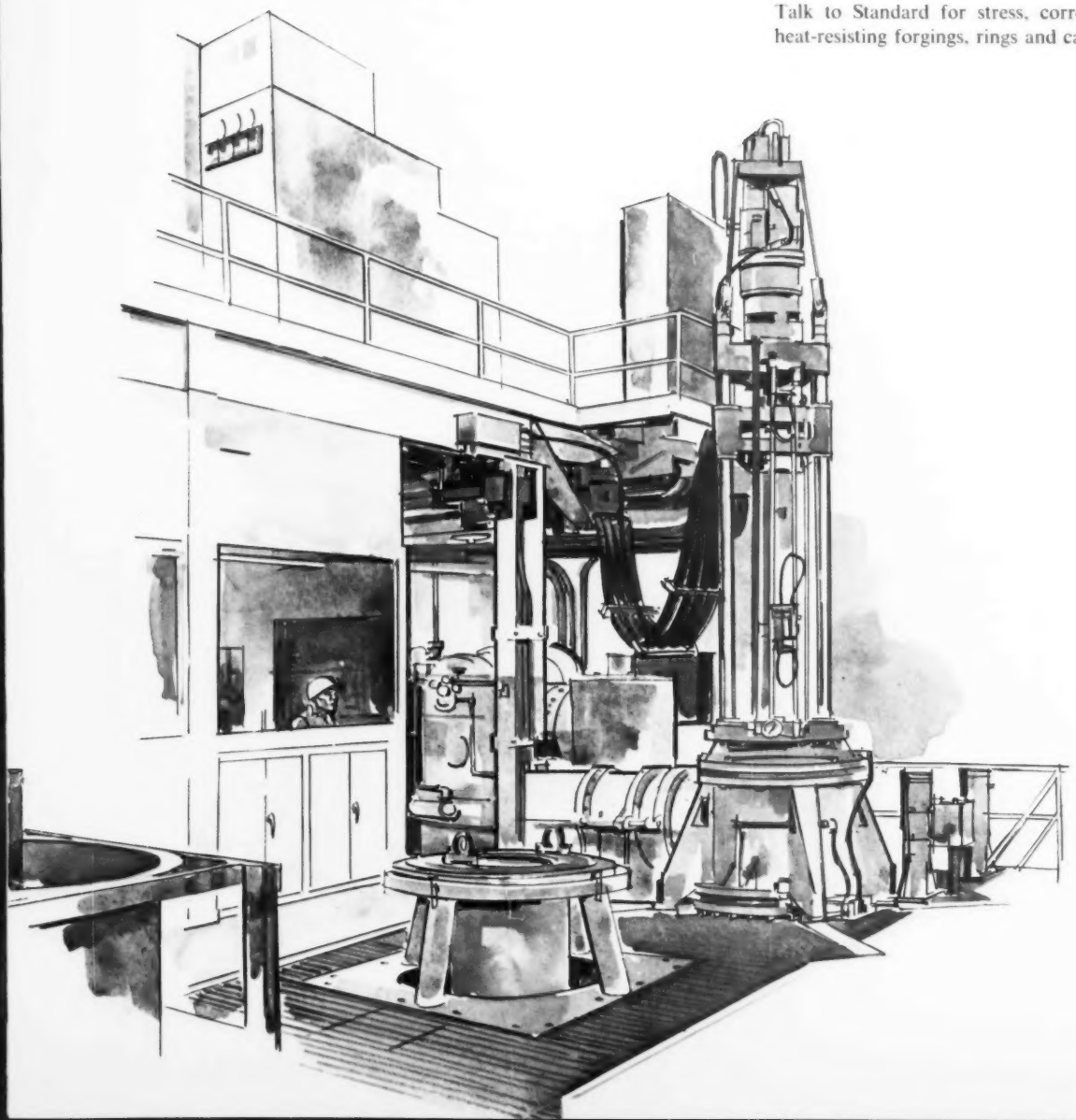
3M COMPANY

EXOTIC STEELS FROM STANDARD

The vacuum arc remelt furnace pictured below is producing some of the largest ingots of the most advanced alloys in commercial production today—superstrength alloys for missiles, such as D-6, AMS-6428, 300M, and special high-temperature alloys for gas turbine, jet engine applications, A286, Waspalloy—to name a few.

This facility rounds out the most modern integrated steelmaking plant for special alloy forgings and rolled rings in the country—electric furnace steels, vacuum degassed, and vacuum remelted.

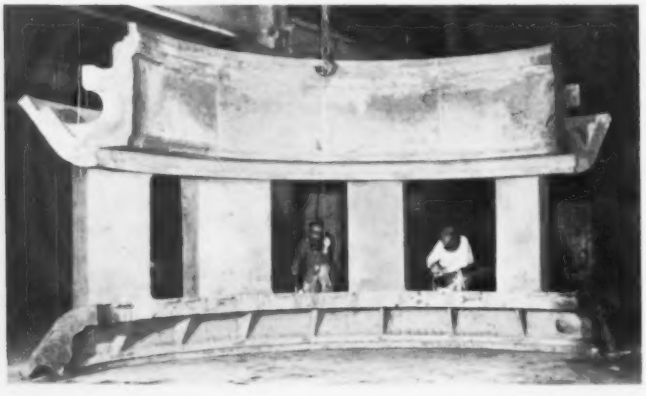
Talk to Standard for stress, corrosion and heat-resisting forgings, rings and castings.



QUALITY CONTROL IS SECOND TO NONE AT STANDARD. Quality control at Standard is maintained by the most accurate, up-to-date testing equipment available. Laboratory facilities operate day and night to support our metallurgists, shop foremen, mill and machine operators—as well as plant management and, of course, our customers.

STANDARD'S OPEN-DIE FORGINGS SUPPLY NATION'S LEADING INDUSTRIES. Steel and nonferrous alloys can be worked in Standard's forge shop, including some hard-to-work metals such as titanium and super alloys. It can turn out forgings from 15 to 52,000 lb.; up to 45 inches in diameter; and up to 60 ft. in length. Major products include rotors and wheels for turbines, propeller shafts for ships, rolls for sugar, printing and rubber industries.

Standard's hundreds of customers represent every major industry in the world. Metal components of carbon and alloy steels, super alloys, and nonferrous alloys such as aluminum and titanium are supplied by Standard for an endless line of products. What particularly impresses our customers however, is the unique, personalized service we provide. See for yourself—bring your next problem to Standard.



STEEL CASTINGS TO VIRTUALLY ANY SPECIFICATIONS. The Standard foundry, one of the larger ones in the country, has turned out castings as light as 1 lb., and ranging up to 85,000 lb. They include some of the largest heads ever cast for dredge cutters and also vital components in huge hydroelectric projects throughout the world. Standard yields to none in the skill of its foundry engineers, metallurgists, molders, coremakers and core setters.

PIONEERS IN ROLL-FORGED RINGS . . . STANDARD. Standard's craftsmanship in forming metal rings for heavy industry dates back to 1856. The first all-forged weldless rings were produced in volume for the first time in 1870—at Standard. And much of the development work in forging weldless rings of high-alloy steels, aluminum and titanium has been done in Standard's Ring Department.

Standard Steel Works Division

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Rings • Shafts • Car wheels • Gear blanks • Flanges • Special shapes

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MI-61-1

World War III?

Sir—Please accept this as a note of praise and thanks from me. Your recent editorial on labor unions and the one entitled "Freedom Is Dying: The Reds Are Killing It," (IA, May 4, p. 5) are exactly what I have been saying for a long time.

I believe people like you and I can do a lot of good in awakening the sense of loyalty and spirit of cooperation we must have if we are to survive this war.

Yes, I believe we are in World War III now. The enemy has weapons like hunger, prejudice, complacency and the advantage of not having to wait for appropriations and bids to build the weapons which kill "directly." But "indirect" weapons kill also. They kill our gold supply, our friends abroad, and yet we sit and do nothing about it.

I say thank God for people like you, and I wish your magazine would reach every person in the world. Maybe then we would get some action.

As free men, we have the right to disagree with each other, but someone had better wake us up in time to realize that we might also agree with each other before it's too late. I hope you can be that person.—Tom Howell, Southfield, Mich.

Circulated

Sir—For a very long time now I have put off writing you and expressing my sincerest appreciation for your very outstanding editorials which appear each week in The IRON AGE. You might be interested in knowing that we circulate your editorial throughout our office each week so everyone will have the opportunity of reading it—and always with the hope that it might do a little "regenerating." Again, many thanks for your fine American thoughts. — James E. Clendennen, assistant treasurer, Krauss Air Conditioning, Inc., St. Petersburg, O.

Patent-Seeker

Sir—In your April 20 issue on p. 107 you have an article by T. M. Rohan entitled "Oxygen Spurs Move to Smoke Control." In this article reference is made to a patented sonic method for cleaning glass fibre dust collecting bags. We are interested in obtaining a copy of this patent and would appreciate it if you could give us sufficient information about it to enable us to procure it from the patent office.—A. M. Bain, Dominion Bridge Co., Ltd., Montreal, Canada.

▪ **For further information write: Dracco Div., Fuller Manufacturing Co., 4063 E. 116th St., Cleveland 5, O.—Ed.**

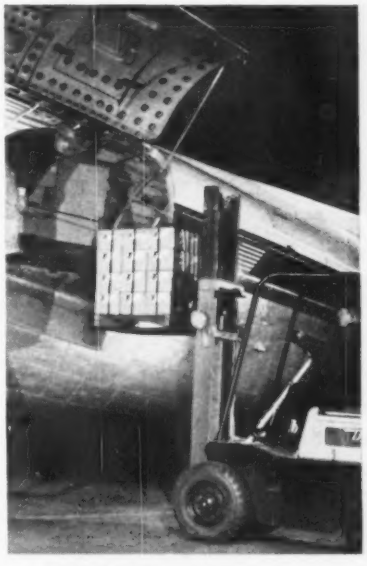
Merger Laws

Sir—Please send me six reprints of the interview with Attorney General Robert Kennedy entitled "Justice Department Policies on Merger Laws" which appeared in the April 13 issue of The IRON AGE. This article is indeed interesting.—D. S. Brisbin, vice president—sales, Columbus McKinnon Corp., Tonawanda, N. Y.

▪ **Reprints will soon be mailed.—Ed.**

"I remember now. I forgot to draw up the plans for that job."

FOR SUPER SERVICE ON QUALITY FASTENERS



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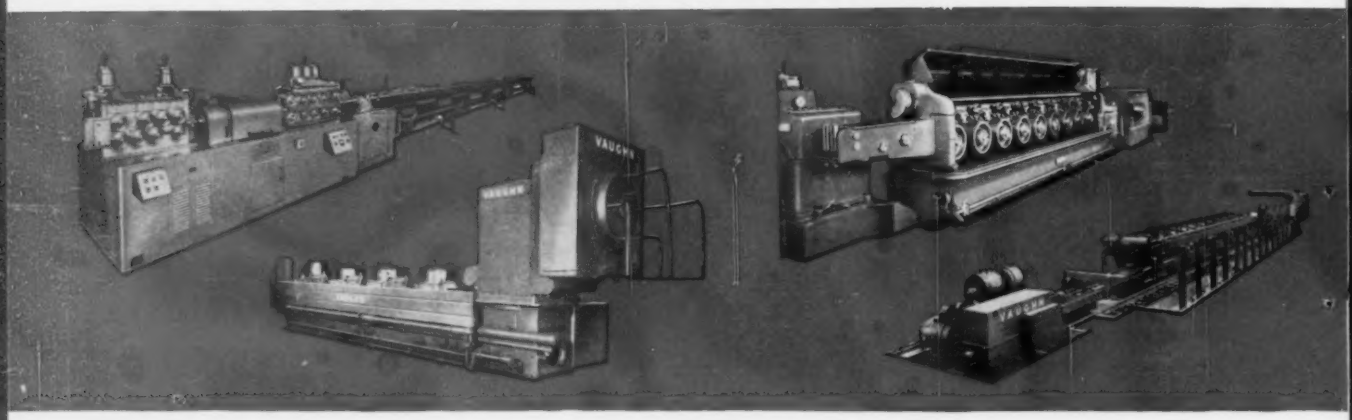

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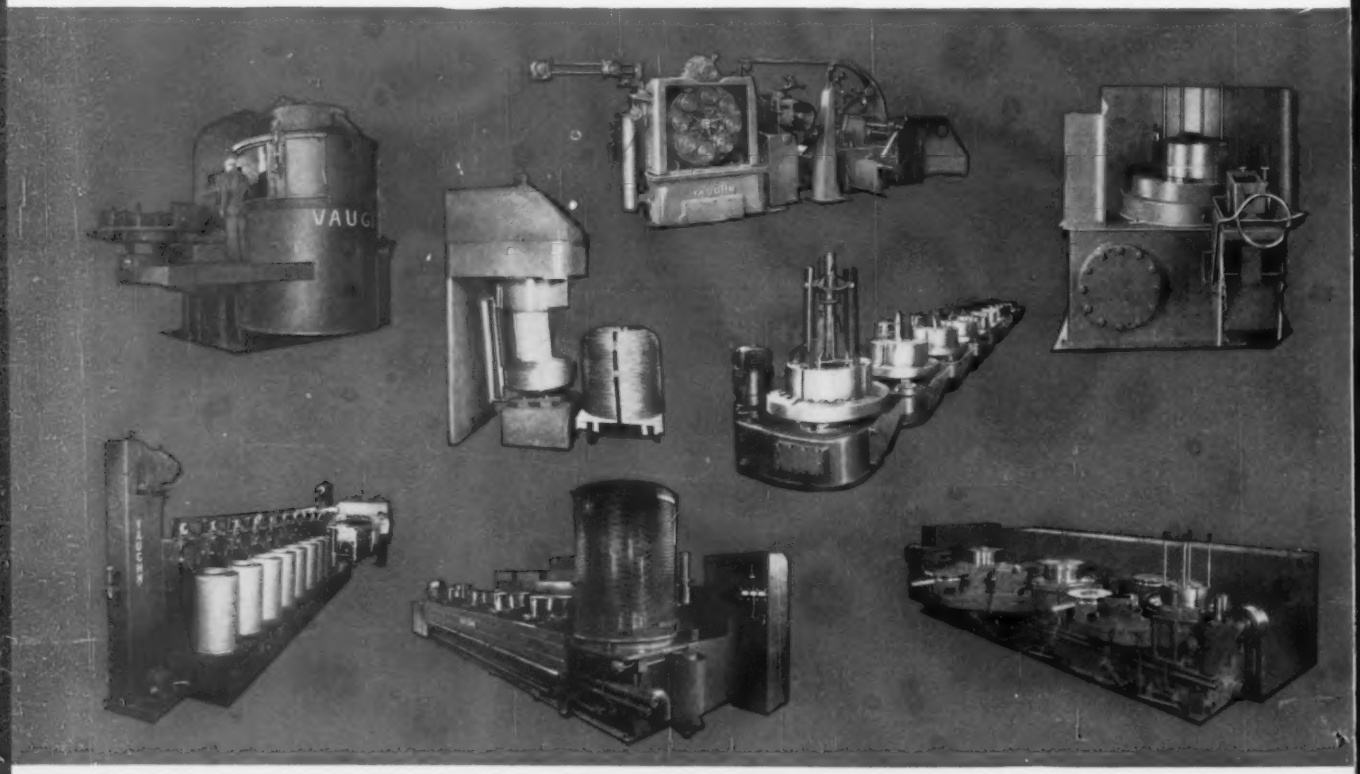

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Changed World

The auto industry had its sales problems back in 1912, but they were not major ones.

Proof comes by way of comment on the auto market that year which appears in the Fafnir Story, a history of the Fafnir Bearing Co., New Haven, Conn.

"Smelly Wagons"—In 1912, one Fafnir executive sent a clipping from a newspaper to another executive with the comment, "Cheer up —business is going to be good in smelly wagons after all."

The clipping was headlined, "Optimism in the Auto World." It pointed out 210,000 motor vehicles, valued at $321 million, had been built in 1912.

Big Difference—It's interesting to compare these totals with the 7.8 million vehicles turned out in 1960 or the record 9.1 million in 1955. (For the latest news on auto sales see p. 74.)

In 1912 the export market for cars was rising. But there was worry about larger used car stocks.

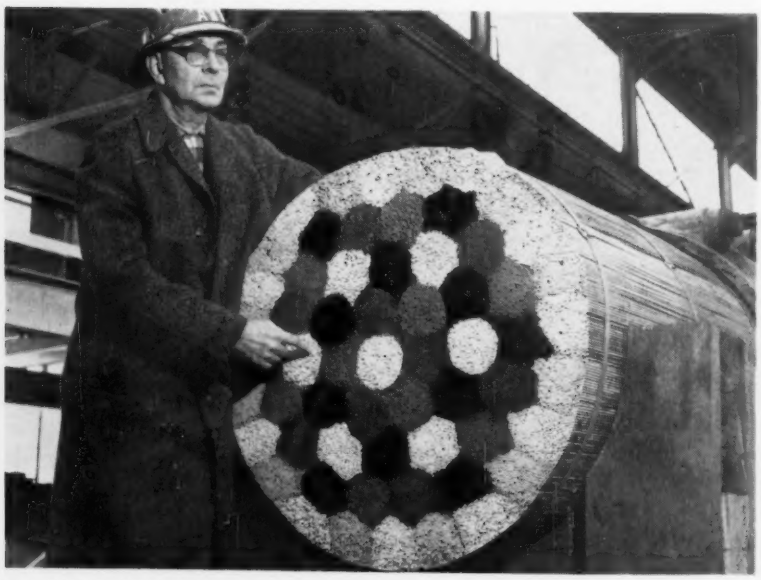
Used Rockets for Sale?

Today it's not used cars which are in the news, it's used rockets. Such is progress.

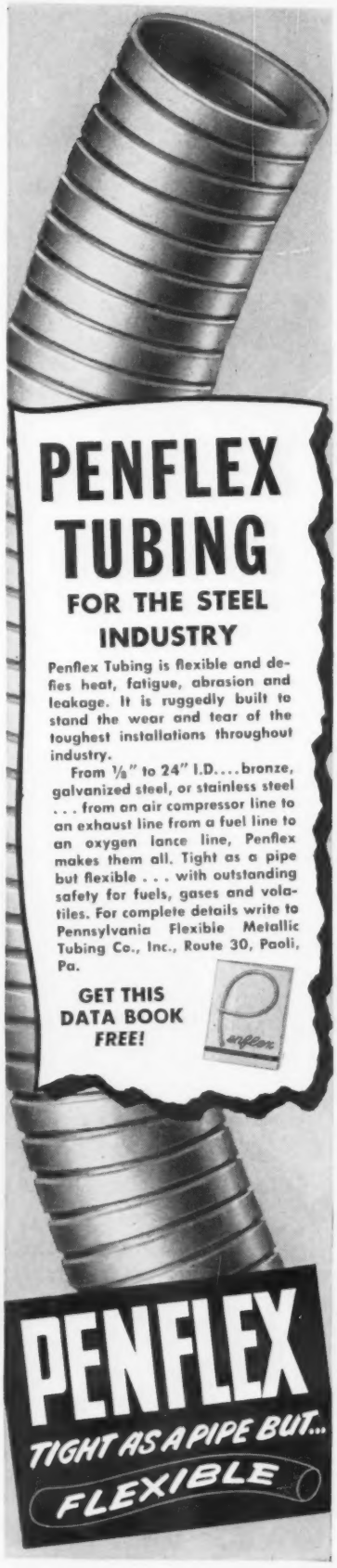
Rocket trade-in may be a coming development, according to the Aerojet-General Corp.

Just like used cars, Aerojet says, phased-out rockets still have a lot of mileage left in them. The Aerojet Aerobee is given as an example. Built 14 years ago, it is still in use on research projects.

So who knows, the day may come when you'll read a classified ad like this: For Sale — good used rocket. Driven only by a little old scientist from Pasadena. Sam's Used Rocket Lot, one block east of Cape Canaveral.



26,108 LENGTHS OF WIRE: That's the number of strands of bridge wire in this cable. It's a sample of the four bridge cables which American Steel & Wire Div. of U. S. Steel Corp. will build for the new Narrows Bridge between Brooklyn and Staten Island in New York City. Four cables, each 7000 ft long, will be used on the bridge, which will be the world's longest single suspended span. It's scheduled for completion in 1965.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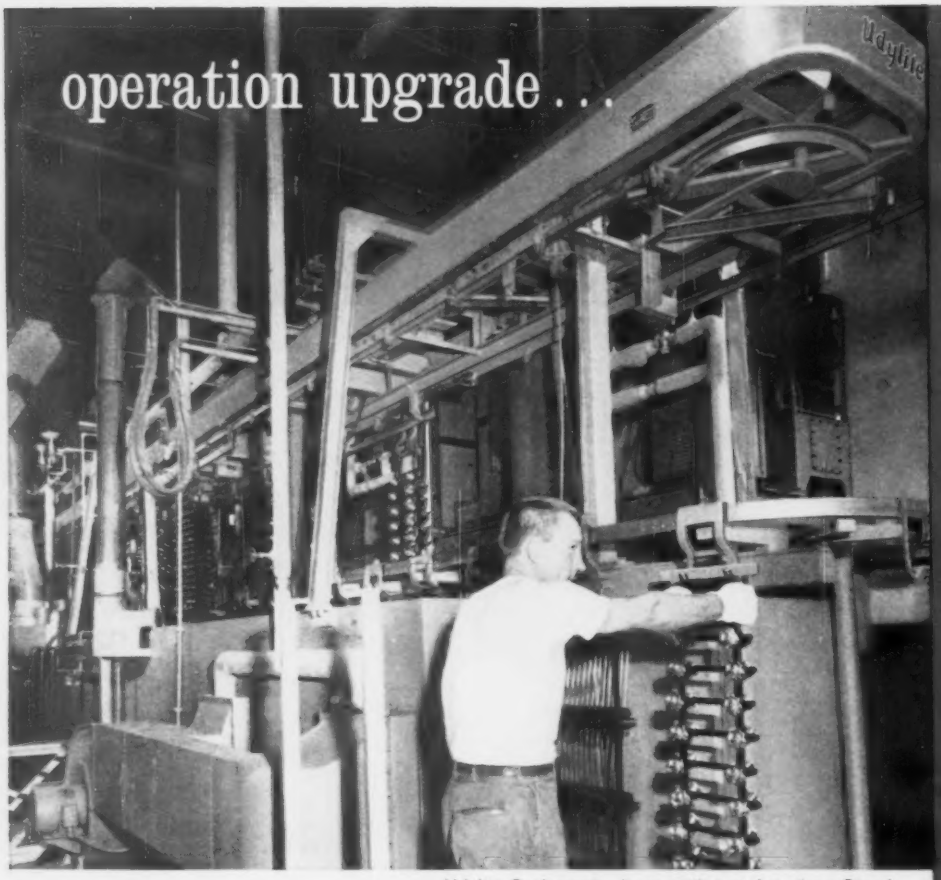

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This Udylite Cyclemaster, which is another way to say low cost automation, represents six important areas of improvement in American Standard's plating production.

- quality control to meet their most exacting top standards
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COMING EXHIBITS

Tool Show—May 22-26, American Society of Tool and Manufacturing Engineers, New York Coliseum. (Society headquarters, 1070 Puritan, Detroit 38, Mich.)

Plastics Exposition—Ninth annual, June 5-9, New York Coliseum.

Instrument - Automation Show—June 5-8, Instrument Society of America, Royal York Hotel, Toronto, Canada.

MEETINGS

MAY

Wire Reinforcement Institute—Annual meeting, May 29-30, The Greenbrier, White Sulphur Springs, W. Va. Institute headquarters, National Press Bldg., Washington, D. C.

JUNE

American Gear Manufacturers Assn.—Annual meeting, June 4-7, The Homestead, Hot Springs, Va. Assn. headquarters, 1 Thomas Circle, Washington.

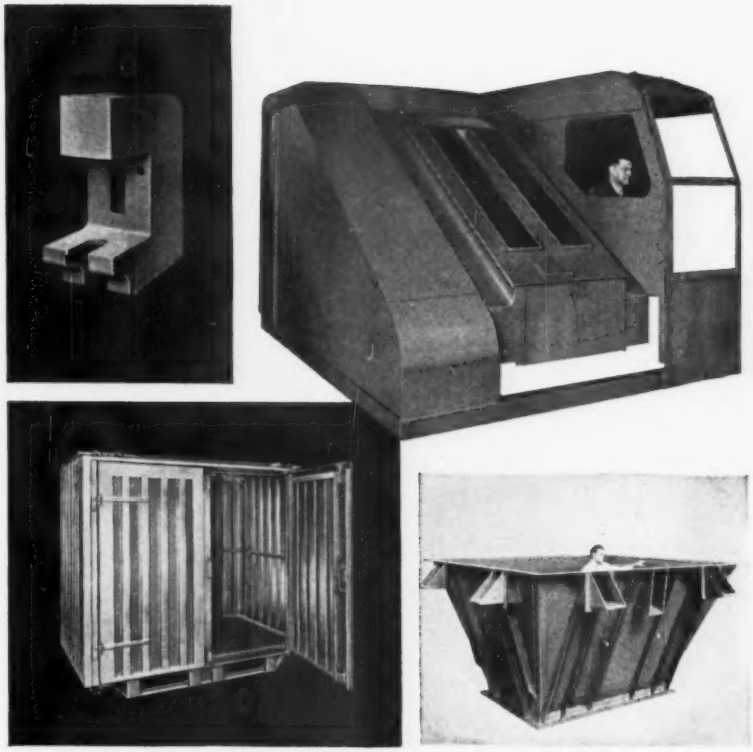
National Assn. of Purchasing Agents — Convention and show, June 4-7, Conrad Hilton Hotel, Chicago. Assn. headquarters, 11 Park Place, New York.

Institute of Appliance Manufacturers — Annual meeting, June 5-7, Netherland Hilton Hotel, Cincinnati. Institute headquarters, Shoreham Hotel, Washington, D. C.

Society of Automotive Engineers, Inc. — Summer meeting, June 5-9, Chase-Park Plaza Hotel, St. Louis. Society headquarters, 485 Lexington Ave., New York 17.

National Assn. of Secondary Material Industries, Inc.—Pacific Coast Div. regional meeting, June 8, Benjamin Franklin Hotel, Seattle, Wash.; Midwestern Div. regional meeting, June 15, Statler - Hilton Hotel, Cleveland.

(Continued on P. 34)



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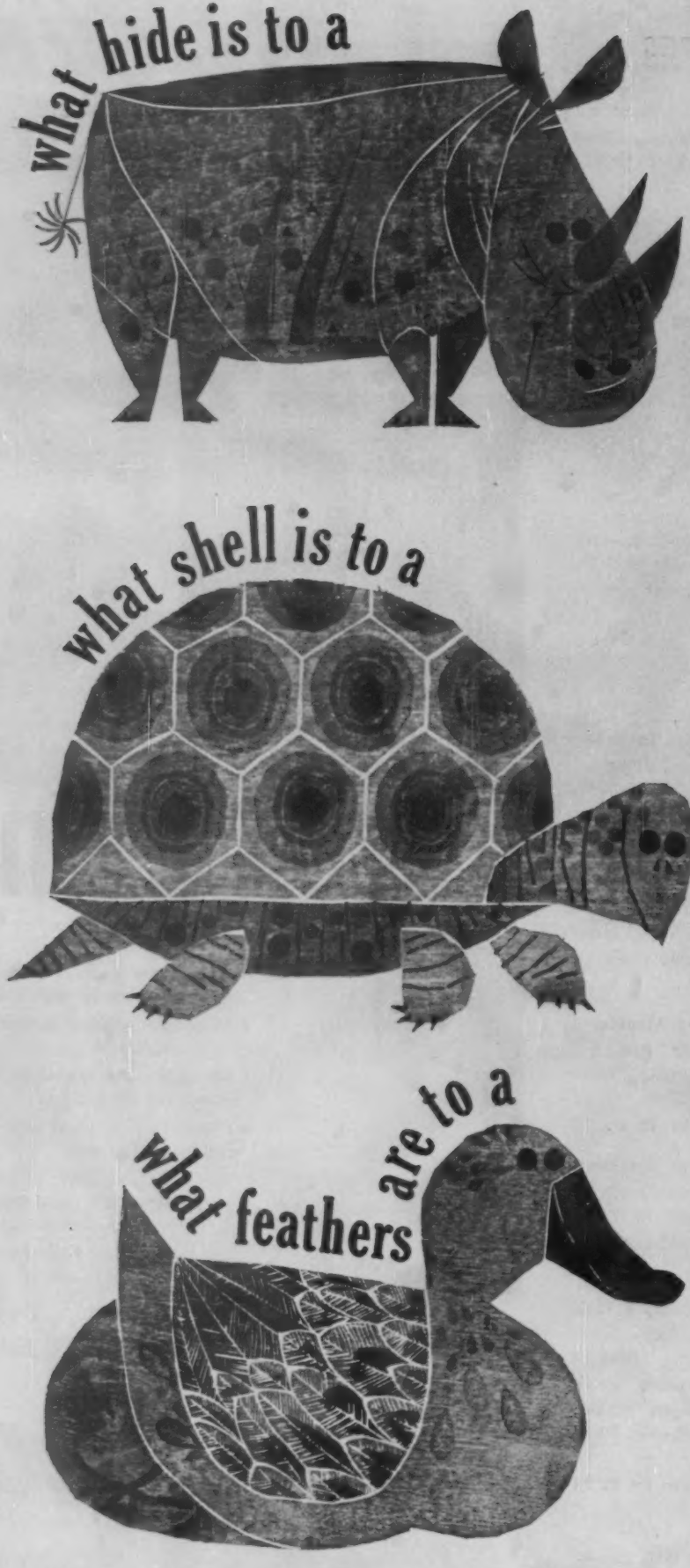
what hide is to a
what shell is to a
what feathers are to a

... TI-CO® IS TO ANY PRODUCT WHERE MOISTURE AND CORROSION ARE A PROBLEM

In automobiles—underframe components, mufflers, other exposed parts, all benefit from the corrosion-resistant properties inherent in TI-CO galvanized steel.

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STEEL PRESIDENT reports:

Soffel's EXOTHERMIC SIDEBOARDS

"increase production and lower overall costs. Profits reflect the superiority of this method of pouring alloy and all grades of steel."

Yes, experience in pouring hundreds of heats of steel using Soffel's Exothermic Sideboards in the heads of Big End Down molds shows significant benefits are derived. First, increased ingot yield of sound top cut steel; second, lower labor costs at the pouring platform and in reduced track time; third; increased slab yield; fourth, more out the door product.

You'll be happier with your profit picture when you see the results of using Soffel's Exothermic Sideboards in your melting operations.

Give them a fair trial soon.

PRODUCT ADVANTAGES

- Eliminate permanent and conventional hot tops.
- Easy, and single, stripping of Big End Down molds.
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Soffel's Exothermic Sideboards increase ingot yield, assure top cut soundness and provide more ton steel out the door per ton of steel in the ingot.

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Pittsburgh Metals Purifying Co.

A Division of Treesdale Laboratories, Inc.

MARS, PENNSYLVANIA

MEETINGS

(Continued from P. 31)

Appalachian Underground Corrosion—Short course, June 6-8, West Virginia University, Morgantown, W. Va.

Malleable Founders Society—Annual meeting, June 8-9, Broadmoor Hotel, Colorado Springs, Colo. Society headquarters, 781 Union Commerce Bldg., Cleveland.

Manufacturing Chemists Assn., Inc.—Annual meeting, June 8-10, The Greenbrier, White Sulphur Springs, W. Va. Assn. headquarters, 1825 Connecticut Ave. N.W., Washington 9, D. C.

Assn. of Industrial Advertisers—Annual conference, June 11-14, Statler-Hilton Hotel, Boston. Assn. headquarters, 271 Madison Ave., New York 16, N. Y.

Drop Forging Assn.—Annual meeting, June 14-17, The Greenbrier, White Sulphur Springs, W. Va. Assn. headquarters, 1121 Illuminating Bldg., Cleveland.

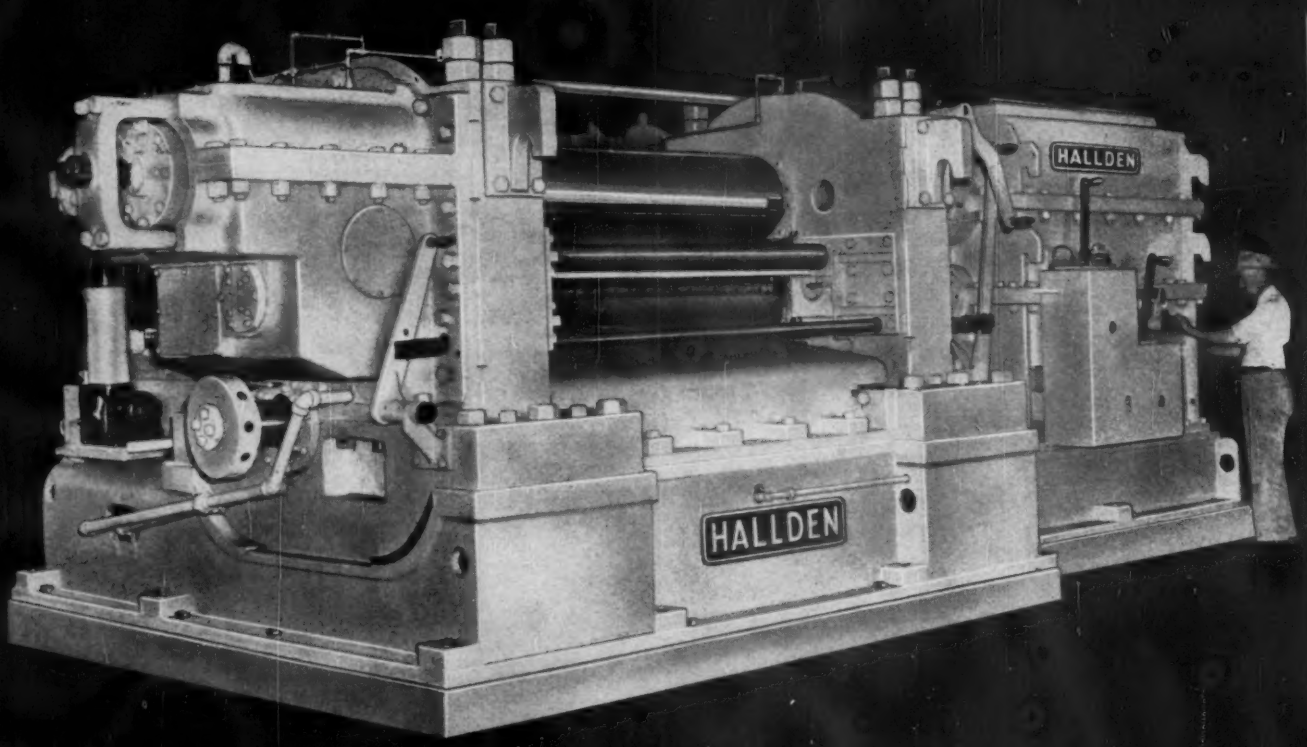
Society of Plastics Engineers, Inc.—Regional technical conference, June 14, Montreal, Canada. Society headquarters, 65 Prospect St., Stamford, Conn.

American Society of Mechanical Engineers—Applied mechanics conference, June 14-16, Illinois Institute of Technology, Chicago. Summer annual meeting, June 11-15, Statler-Hilton Hotel, Los Angeles. Society headquarters, 29 W. 39th St., New York 18.

Pressed Metal Institute—Sales conference, June 15-16, Bedford Springs Hotel, Bedford Springs, Pa. Institute headquarters, 3673 Lee Rd., Cleveland.

Material Handling Institute, Inc.—Meeting, June 18-20, Hilton Hotel, Pittsburgh. Institute headquarters, One Gateway Center, Pittsburgh.

Alloy Casting Institute—Annual meeting, June 18-20. Institute headquarters, 1001 Franklin Ave., Garden City, N. Y.



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Combine Accuracy, Speed, Durability

- **Infinite length-of-cut control**
- **Full synchronization**
- **Minimum adjustment**
- **Reliable performance**

All these features are assured by such Hallden design extras as hardened torque correcting surge gears, dynamically balanced components, precision fitted parts.

Hallden shears are engineered and built to meet the requirements for the most modern high speed strip processing lines.

For custom designed synchronized flying shears for all high production strip shearing, consult Hallden, the worlds foremost designers of flying shears.

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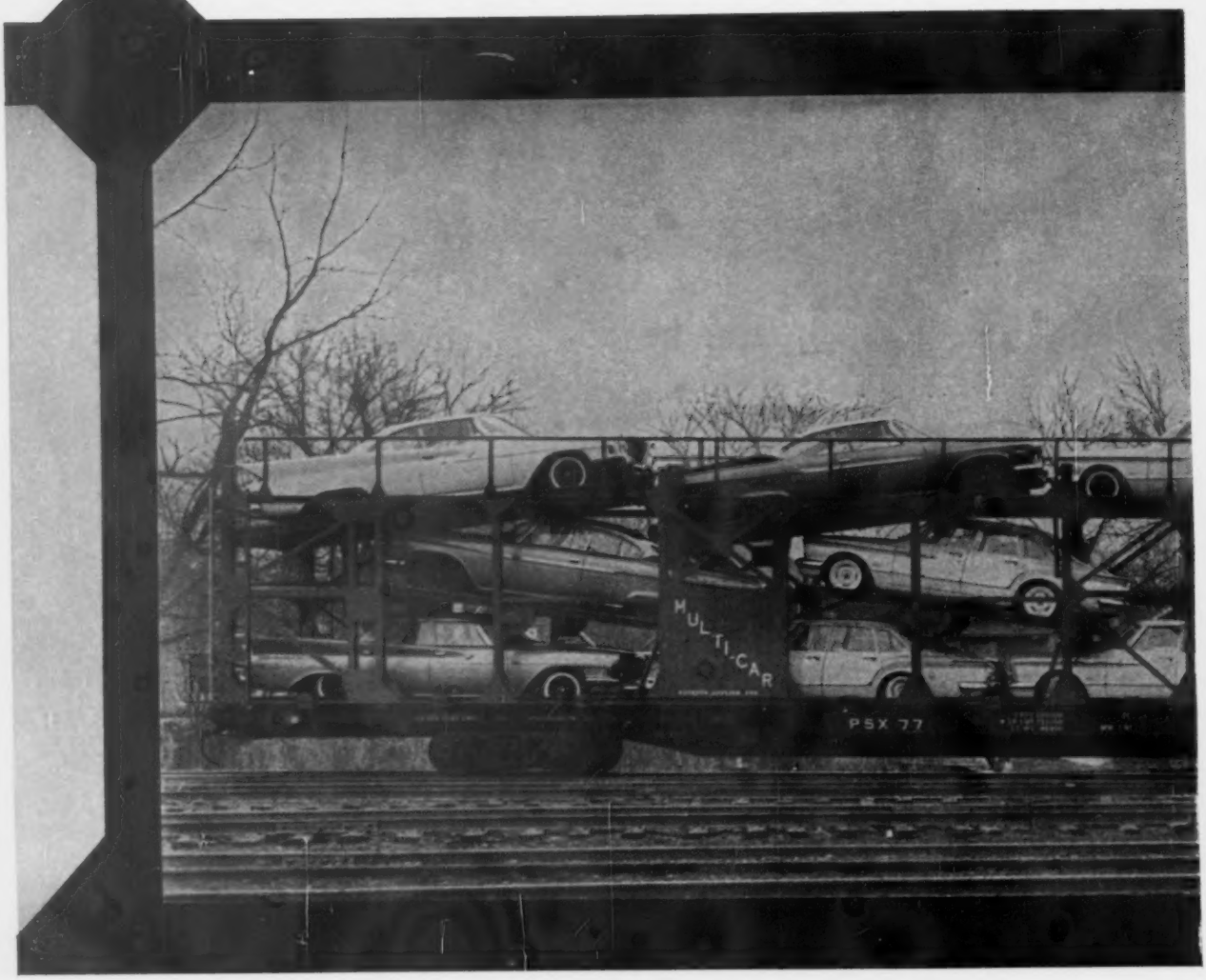
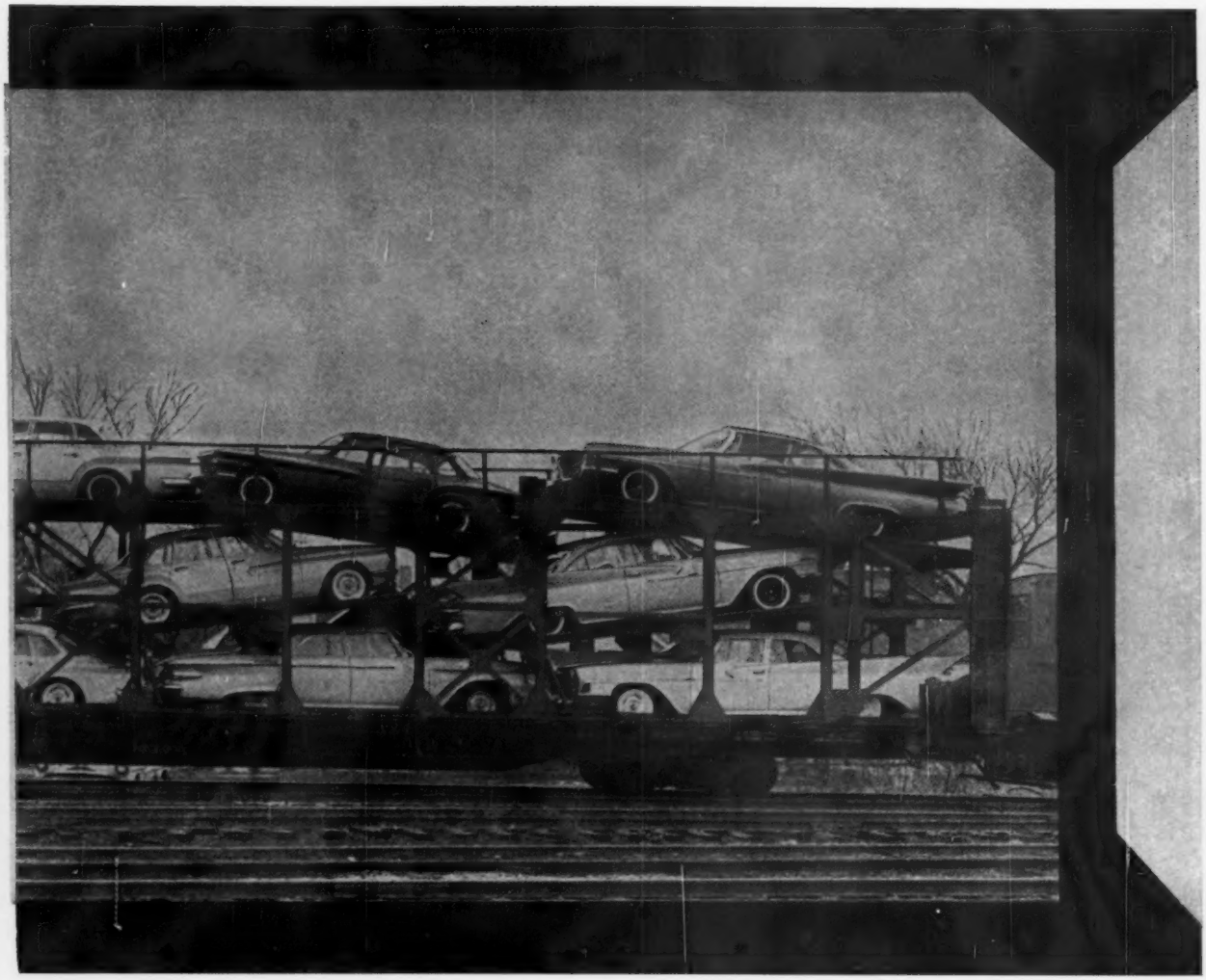


GLX-W COLUMBIUM-TREATED CARBON STEEL CUTS DEAD WEIGHT 10% IN NEW

VERSATILITY...
That's the Beauty of Steel

Bringing important new economies to rail shipment of automobiles, this new tri-level auto carrier holds twelve standard cars or mixed loads of 14 standards and compacts. Capacity is increased up to 75%. A unique system of hydraulically positioning the vehicles on three levels gives a clearance of only 16 feet 8 inches, permits use in areas formerly limited to bi-level unit operation because of clearance requirements. ◆ Key feature of the Multi-Car Carrier is the movable decks on which the cars ride. Made of GLX-W columbium-treated steel, the decks are raised and lowered by built-in hydraulic lifts, actuated by a portable power unit. Here light weight was essential, in order to reduce the operating power requirements. Yet great strength was necessary, too, to support the payload. Finally, design of the decks called for eight bends in each section. So formability was also a must. ◆ GLX-W met and exceeded all these requirements. It gives 50-100% greater strength than mild carbon steel, so builder Whitehead and Kales could get the required strength with less weight. Deck operating units need less power,

Great Lakes Steel is a Division of



Multi-Car Carrier built by Whitehead and Kales for Multi-Car Corporation, Detroit, Michigan

TRI-LEVEL AUTO CARRIER

and total weight is reduced approximately 5,000 pounds or 10%. Production is more economical, too, because the ductility and formability of GLX-W permits four of the bends in the deck to be performed in one press operation. ◆ The GLX-W series of high-strength steels consists of fine-grained, semi-killed mild carbon steels, treated with varying amounts of columbium. The high strength of GLX-W permits designers to reduce the amount of steel and effect considerable cost savings when replacing mild carbon steel. GLX-W steels have a low carbon content and are readily weldable and formable. GLX-W steels are available at four minimum yield strength levels: 45,000, 50,000, 55,000 and 60,000 p.s.i. and in sheets, plates and bars. For complete technical information, write Great Lakes Steel Corporation, Product Development, Dept. IA-9, P. O. Box 7310, Detroit 2, Michigan.

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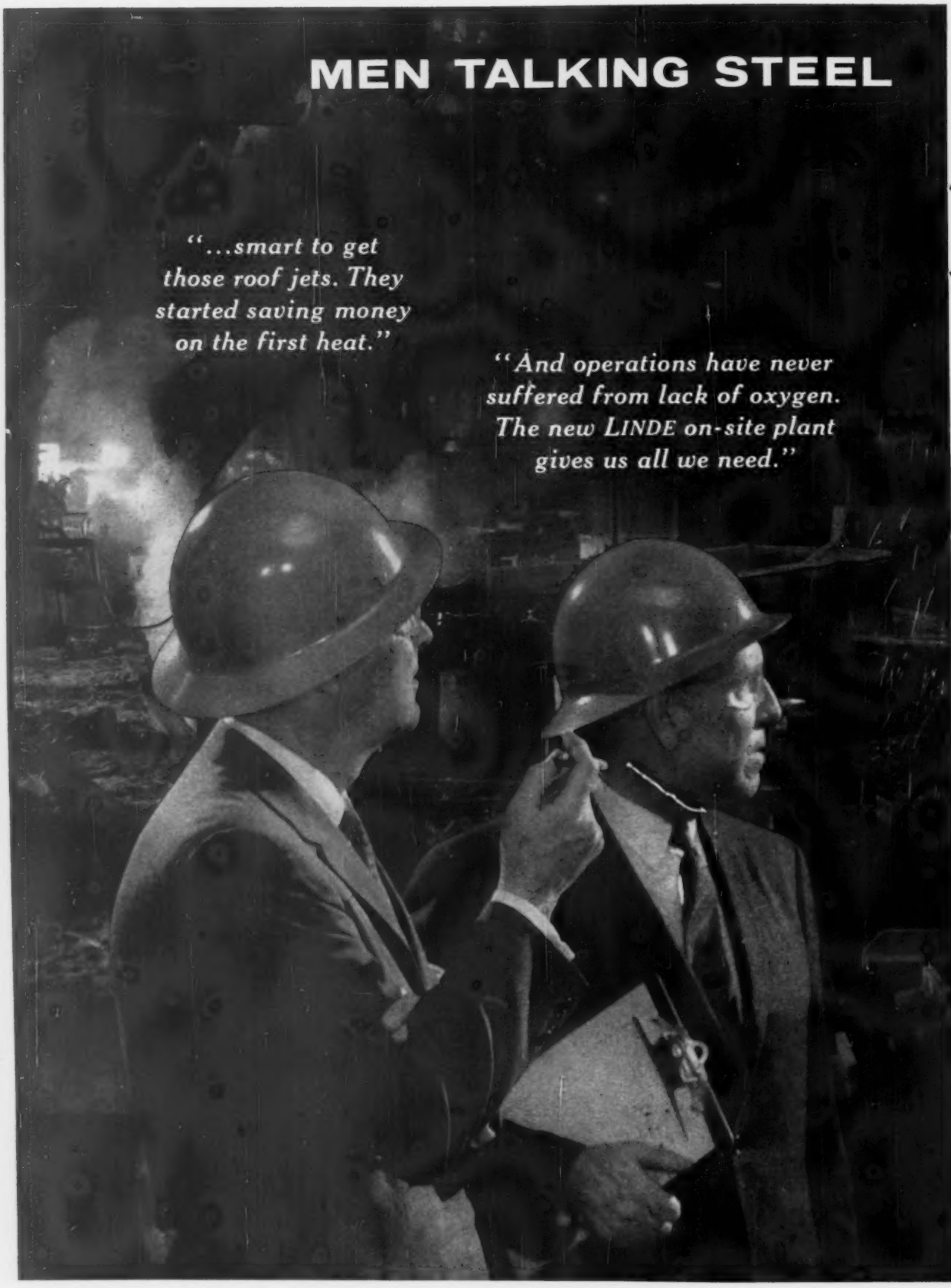
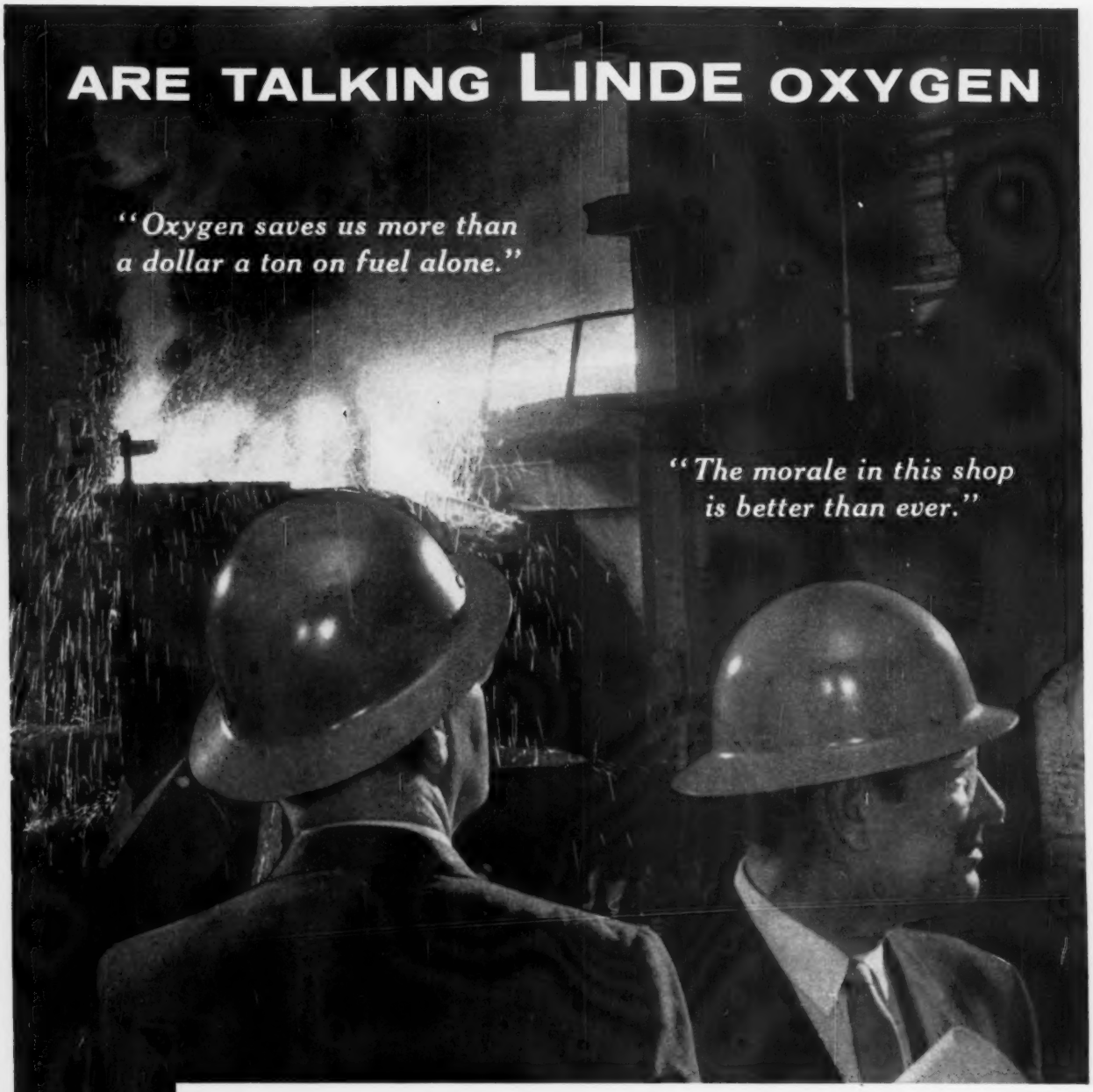

MEN TALKING STEEL
"...smart to get those roof jets. They started saving money on the first heat."
"And operations have never suffered from lack of oxygen. The new LINDE on-site plant gives us all we need."

ARE TALKING LINDE OXYGEN



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Plating in the news

How DSC DEEP ROLLED RBF STEEL STRIP Can Give Your Products a Durable, Expensive-Looking Showroom Finish— *Inexpensively*

AUTOMOTIVE NEWS recently reported on a new durable double-nickel chromium plating process that was "sweeping industry" and giving plating "its biggest technical gain in 31 years."

This is good news to many manufacturers, perhaps yourself included, who feel that no material is quite as mirror-bright and expensive-looking as chromium plated steel. What's more, the new finish promises far greater resistance to corrosion than existing processes under like conditions, and it lowers costs by eliminating handwork.

MORE POWER TO THE NEW PROCESS—It promises additional good reasons for the use of DSC DEEP ROLLED *RBF* STRIP instead of more costly substitutes. Meanwhile even with existing chromium plating procedures, our recently improved *RBF* finish is proving durable, reliable and economical. We will arrange for you to try it. Then judge for yourself.

WHY DEEP ROLLED?—Because this *Accutronic*® Strip is produced on bright planished rolls *all the way*—from the first cold reduction pass to the last. "Satin" never touches this strip. That's why it won't break out in a "pepper-and-salt" rash even in severe bending, forming or drawing.

WHY ECONOMICAL?—Because *RBF* is our improved *R*egular *B*right *F*inish. It carries no "extra." Interleaving isn't needed . . . another way of saving money for you.

BENEFICIARIES—Among satisfied DSC strip customers are manufacturers of automotive trim and accessories, appliances, toasters, broilers, housewares, hardware items and a host of other eye-appeal products.

LET'S TEAM UP—For up-to-date information about DSC *Accutronic*® Strip—low carbon, high carbon or improved DEEP ROLLED *RBF*—call your nearest DSC customer "Rep" or write direct: Detroit Steel Corporation, Box 7508, Detroit 9, Michigan.

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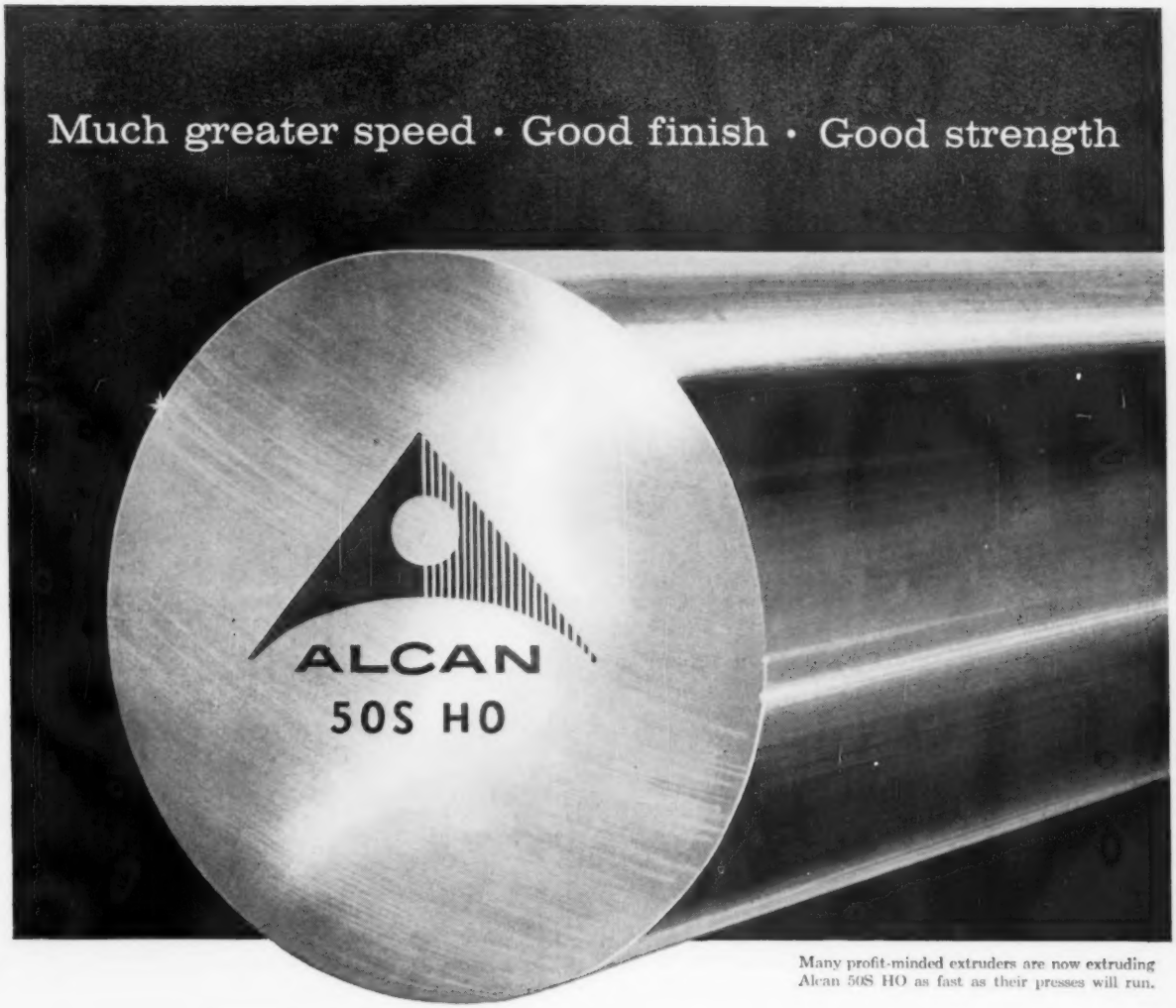
Much greater speed · Good finish · Good strength



Many profit-minded extruders are now extruding Alcan 50S HO as fast as their presses will run.

Here in one aluminum ingot...

much greater extrusion speed... plus good finish and strength

WHEN you run Alcan 50S HO you get greater production . . . per day and per machine-hour . . . while still maintaining good mechanical properties and finish.

That sums up the experience of many fabricators now using this much-improved version of the long-time favorite Alcan 50S. They're unanimously enthused about its increased press speed . . . *up to maximum press capacity.*

Because of the all-around performance of Alcan 50S HO, there is no longer any necessity for stocking a large variety of ingot products. This one ingot takes care of the majority of product runs. Alcan 50S HO Ingot can reduce your inventory as much as 60%.

Alcan of course supplies other types of extrusion ingot to meet special job requirements.

Run 50S HO on your own equipment . . . and clock your production on the run-out table.

For further information on Alcan 50S HO, write or phone your nearest Aluminium Limited Sales Office.

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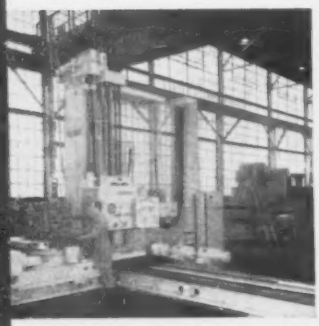
ALCAN

ANOTHER REASON TO SPECIFY **GENERAL ELECTRIC** NUMERICAL CONTROL



Cincinnati Gilbert Floor-type Horizontal Boring Mach., G-E Mark II NPC

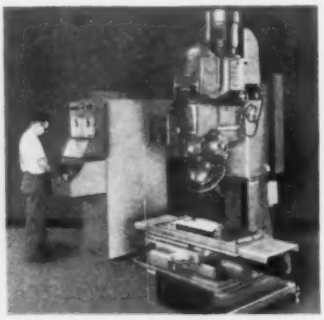
Edlund Edlund-Matic (TM) Drilling and Tapping Machine, General Electric Mark II NPC

LeBlond Tape Turn Lathe, controlled by G-E Mark Century Numerical Contouring Control

Hill Beam Drilling Machine, General Electric Mark IV NPC

Moline Tube Sheet Drilling Machine, General Electric Mark II NPC

Fosdick Fosmatic Turret Drill with Automatic Depth Control, General Electric Mark II NPC



Brown & Sharpe Turr-E-Tape Six-spindle Turret Drilling Machine, G-E Mark II NPC

Wiedemann Turret Punch Press, General Electric Mark II NPC

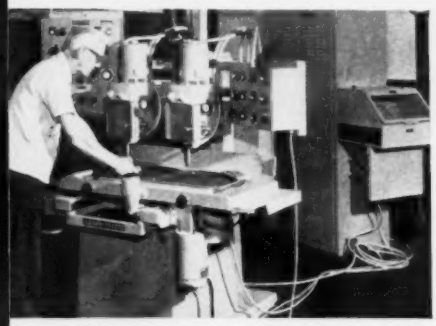
Selected by 50 machine-tool builders,

A double vote of confidence for General Electric's unmatched experience in designing, building, and applying numerical controls is evidenced by . . . the more than 50 builders who put them on the machines they sell . . . and, the over 500 American applications where they daily prove their outstanding performance on a variety of drilling, milling, punching, turning, and boring machines.

Many builders have used G-E automatic machine control since General Electric introduced electronic tracer control in 1943. Others selected G-E control based on the Company's pioneering work to develop the first magnetic tape contouring control in 1947. And many more turned to G.E. when the first building-block "packaged" positioning control—

NUMERICAL CONTROL
FOR AUTOMATION

American Tool Travelling 19-inch Column Openside Boring and Drilling Machine, General Electric Mark II NPC



Leland Gifford Two-head Printed Circuit Board Machine, General Electric Mark II Numerical Positioning Control

TODAY'S GENERAL ELECTRIC NUMERICAL CONTROL LINE features new Mark Century Numerical Positioning and Contouring Control (rear) and job-proved Mark Series Numerical Positioning Control for two to five motions (front).

proved in 500 metalworking applications

the Mark Series—was introduced in 1957. Its on-the-job record brought selection on 26 new machines exhibited at last year's Machine Tool Exposition.

And the current outlook is even brighter. New G-E Mark Century Numerical Control—utilizing solid-state circuitry—makes possible economical precision contouring with punched-tape input.

There are additional reasons to specify G-E numerical control: a full line to select from; nationwide service to minimize downtime; convenient time payment plan; and more that your machine tool builder or G-E Sales Engineer can tell you about. Or, write for descriptive bulletins to General Electric Company, Schenectady, New York. *Specialty Control Dept., Waynesboro, Virginia.* 795-13

Progress Is Our Most Important Product

GENERAL ELECTRIC

Custom Quality

OHIO COLD DRAWN

features improved physicals, closer tolerances, better finish

Arrows indicate approximate center of weld line. After normalizing, cold drawing and annealing, the weld area cannot be detected even when the polished and acid-etched surface is magnified 100 diameters. This perfect microstructure makes Ohio Drawn-Welded, in every sense, weldless — an ideal tubing for critical mechanical and pressure applications. In addition to cold drawing, a severe test in itself, non-destructive tests such as air, water, magnetic and eddy current, insure 100% acceptability.

A-4363A

WELDED STEEL TUBING

Now Available in Larger Sizes... Heavier Wall Thicknesses

NEWS ITEM:

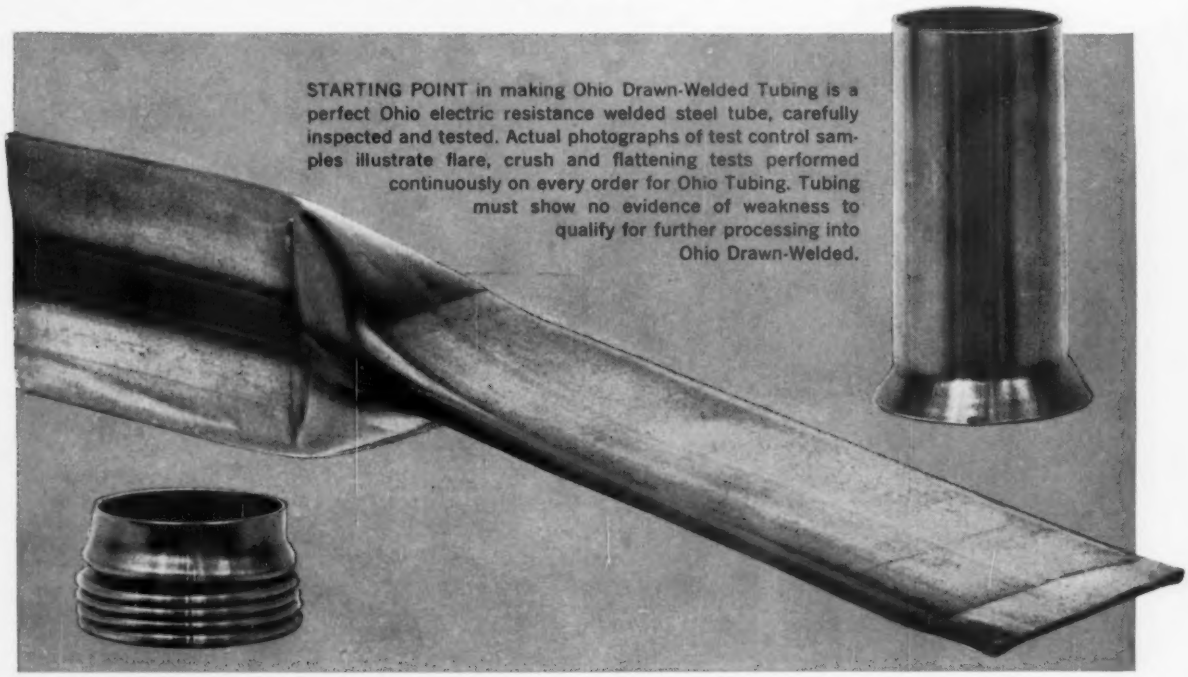
Ohio Seamless is now cold drawing quality electric resistance welded steel tubing up to 7¼ inches with wall thicknesses to .344. Ohio Custom Made Drawn-Welded Tubing is here now — in greater range of sizes, wall thicknesses, finishes than ever before.

TECHNICAL ITEM:

Controlled normalizing assures desired microstructure . . . Precision cold drawing imparts special physical properties, assures uniform wall thickness, delivers closer dimensional tolerances and superior surface finish.

ACTION ITEM:

This all adds up to a new major-source capability that can help you design with new freedom, manufacture at lower costs. Mark your orders: Ohio Custom Made Tubing. Either welded or seamless, it's your best buy whenever tubing is the best shape.



STARTING POINT in making Ohio Drawn-Welded Tubing is a perfect Ohio electric resistance welded steel tube, carefully inspected and tested. Actual photographs of test control samples illustrate flare, crush and flattening tests performed continuously on every order for Ohio Tubing. Tubing must show no evidence of weakness to qualify for further processing into Ohio Drawn-Welded.

OHIO

OHIO SEAMLESS TUBE

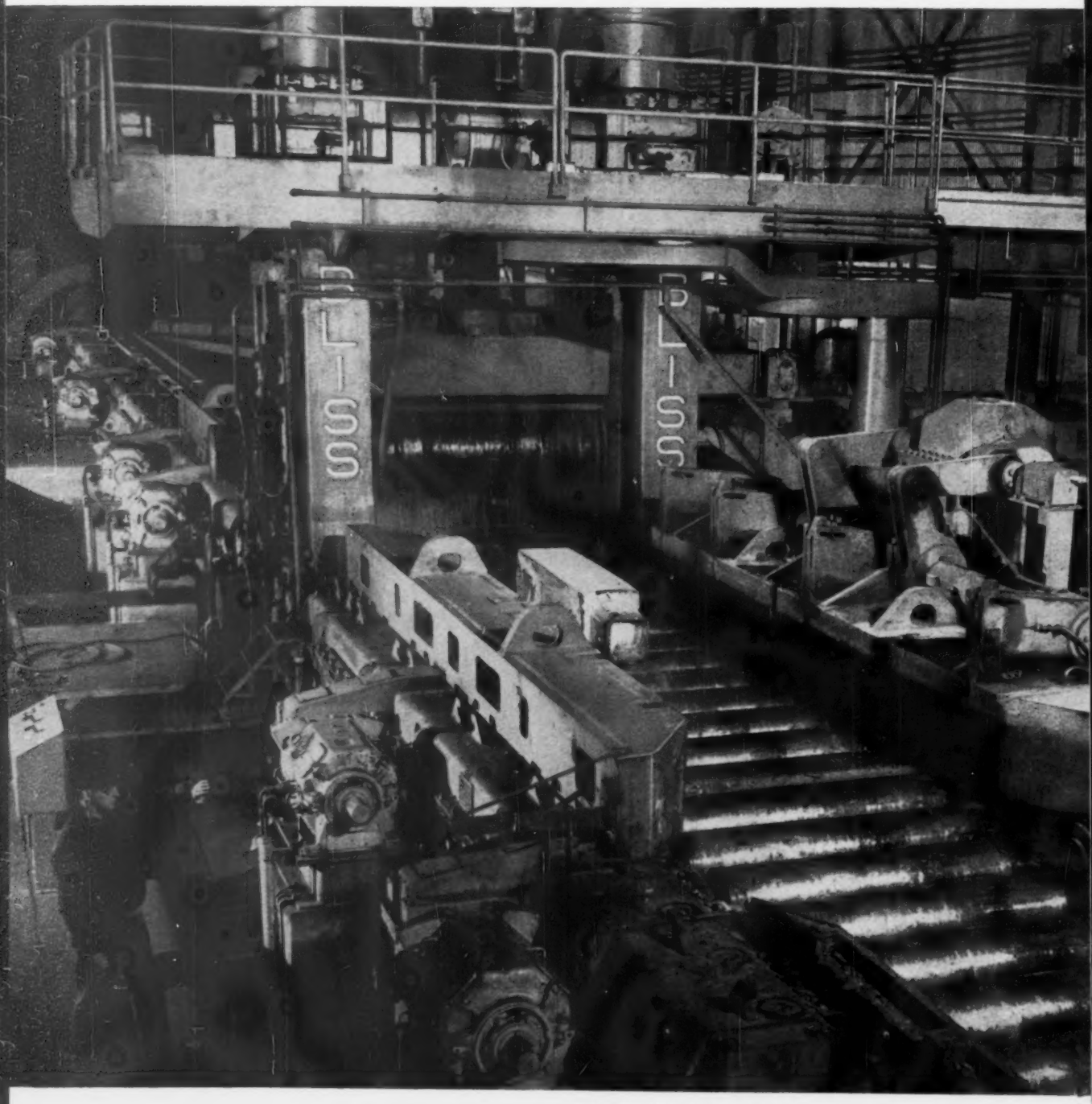
Division of Copperweld Steel Company • **SHELBY, OHIO**

Seamless and Electric Resistance Welded Steel Tubing • Fabricating and Forging

Representatives in principal cities. Check leading directories:
THOMAS', MacRAE'S, CONOVER-MAST, SWEET'S, FRASER'S.

See us at the* DESIGN ENGINEERING SHOW *— Combo Hall, Detroit — May 22-25

SLABS, BLOOMS



Hot ingot heads into first pass through new Bliss mill.

AND ROUNDS ON THIS VERSATILE MILL

Quick handling of ingots another dividend

"Big investment, big dividends" sums up the new automated blooming mill illustrated at left. Key component of a new $14 million steel plant, it was built and designed by Bliss' Rolling Mill Division to enable its owner, a prominent manufacturer of heavy equipment, to meet mounting orders for seamless tubing and welding fittings.

Here is automation at its smoothest. With only a handful of men in efficient control pulpits, the plant can turn out blooms of many shapes and sizes.

Heart of the operation is a new, 40″ x 90″ high-lift blooming mill, whose rolls are automatically set for each pass by punched cards. Taking the ingots poured by the new 100-ton electric furnace, it rolls them into the size required.

Of special interest is the mill's unusually versatile design. Thanks to it, the plant is able to handle round shapes as well as blooms and slabs, simply by changing the rolls. The latter were supplied by Bliss' Mackintosh - Hemphill Division.

According to the plant superintendent, this new plant has increased the company's melting and rolling capacity a full 50%. And based on its proven operating performance, the new Bliss mill will be ready to take any additional new load in stride.

Whether your plans call for a big outlay or a modest one, it will pay you to discuss them with Bliss. To learn how other firms have . . . and have profited . . . write for our 84-page Rolling Mill Brochure, Bulletin 40-B.

BLISS
SINCE 1857

Bliss is more than a name . . . it's a guarantee

E. W. BLISS COMPANY, Rolling Mill Division, Salem, Ohio

Rolling Mills • Mill Auxiliaries • Amerigear / Bliss Spindles

Subsidiary: The Matteson Equipment Company, Inc., Poland, Ohio

Republic helps you

MATCH THE MATERIAL TO THE JOB

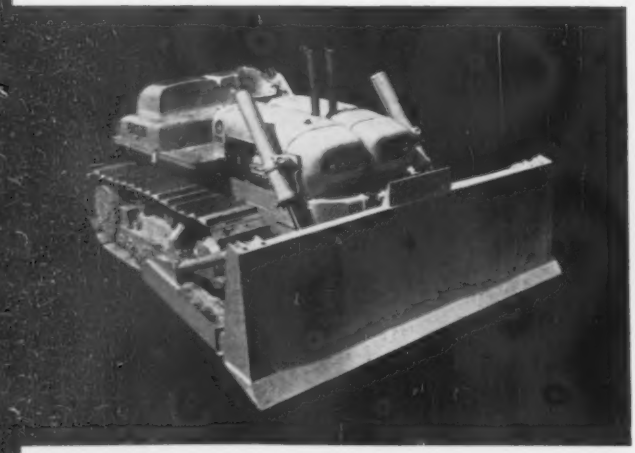
To help cut costs, improve your product quality, meet close-tolerance design requirements . . . you can count on Republic.

Republic . . . where diversified capabilities, modern facilities, and engineering know-how all add up to one important fact: Republic produces the world's widest range of standard steels and steel products. *Steels and products to exactly match your job requirements.*

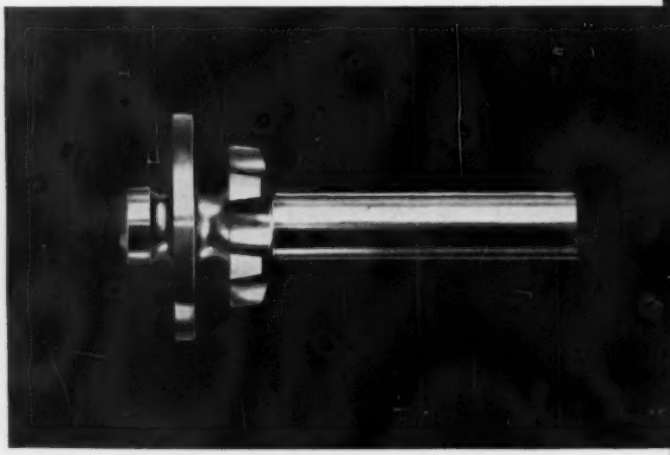
And to help you in the selection of the best, lowest cost material for your requirements, specialists from each Republic Division (metallurgists, engineers, designers) are at your service to work with you and your staff. It's an obligation-free service of

REPUBLIC STEEL

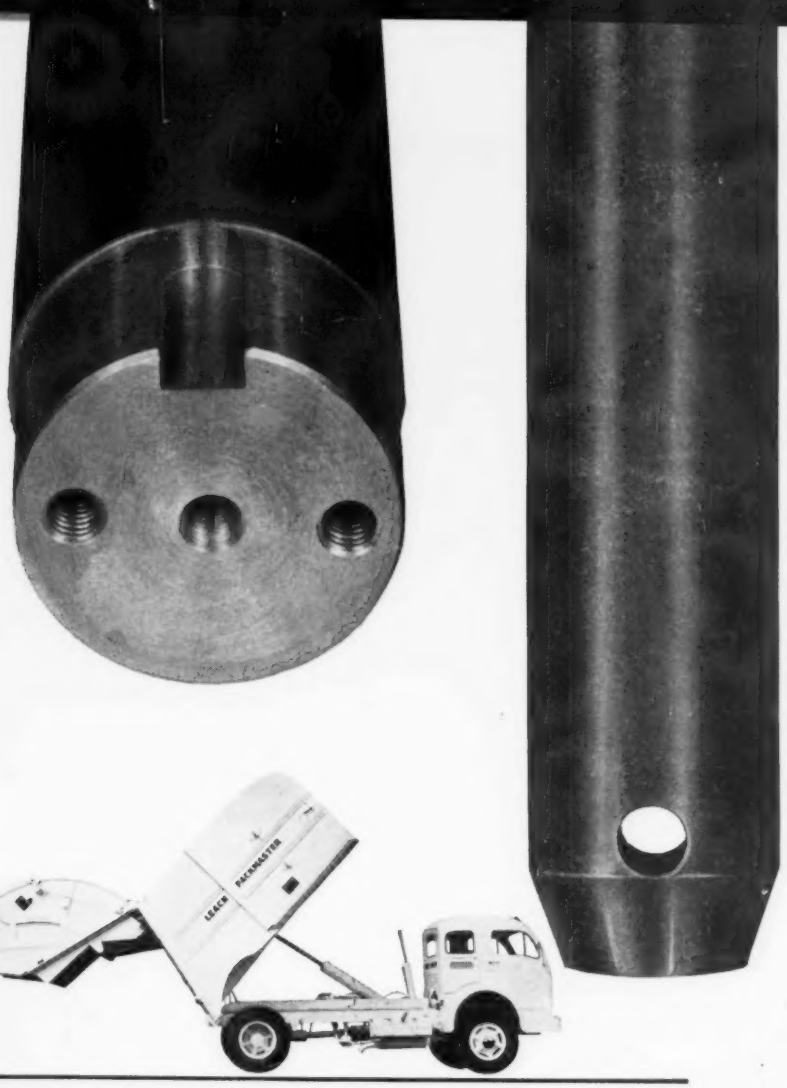
REPUBLIC HAS THE FEEL FOR MODERN STEEL



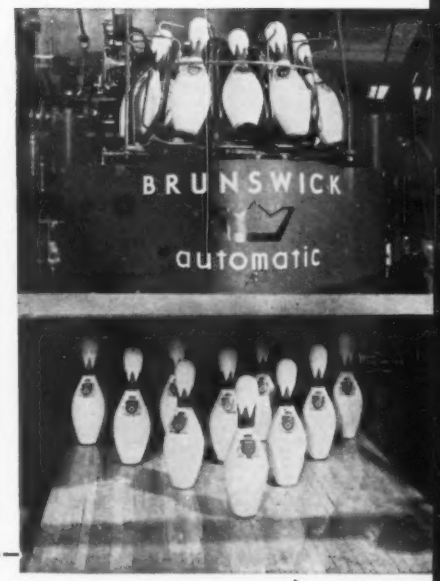
SPECIAL SECTIONS for a dozer. Uniformly high impact- and wear-resistance are musts for grader and bulldozer blades. Bucyrus Blades, Inc., Bucyrus, Ohio, found this combination in a special analysis Republic Hot Rolled Steel. Costs are rock bottom, too, because the steel is Republic-rolled into special sections that trim finishing and forming costs for Bucyrus. Check into Republic Special Sections for your product by mailing the attached coupon.



STAINLESS to beat corrosion and wear. In the manufacture of Hyseal Valve Stems for American-Standard single lever mixing faucets, National Acme Co., Cleveland, required steel with high corrosion- and wear-resistance, plus easy machinability. Material selection: Republic Cold Finished Stainless Steel Bars—Type 303. Completed in a single setup, the 10 machining operations—including multiple end drilling of six holes on a 15° angle—are performed in 12 seconds. Send coupon for information on Republic Stainless for your job requirements.



COLD FINISHED ALLOY BARS form high strength pins. The full weight (up to 5 tons on larger units) of the Packmaster body and its refuse load, rests on steel pins at the pivot points when the unit is hoisted to unload. Republic Cold Finished Alloy Bars, cut off, drilled, and chamfered by the Packmaster Manufacturer, Leach Co., Oshkosh, Wisconsin, offer the toughness and abrasion resistance needed for this application. Investigate the advantages of using Republic Cold Finished Alloy Bars for your component parts production by sending the coupon below.



Steel

Strong,
Modern,
Dependable

ELECTRUNITE Mechanical Tubing to meet close tolerances. Automatic pinsetters—product of Brunswick Corporation—are precision-engineered, rugged mechanical units. Republic ELECTRUNITE Tubing was specified for use in three key locations because it met the extreme tolerance requirements; reduced weight without sacrificing strength; and is delivered ready for fabrication, saving production time and costs. Send for data on the complete selection of ELECTRUNITE sizes, gages, and wall thicknesses.

REPUBLIC STEEL CORPORATION
DEPT. IA-1898-A
1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

Please send more information on:
- ☐ Republic Special Sections
- ☐ ELECTRUNITE® Mechanical Tubing
- ☐ Cold Finished Stainless Steel Bars
- ☐ Cold Finished Alloy Bars
- ☐ Metallurgical, Machining, Design Service

Name_____ Title_____

Company_____

Address_____

City_____ Zone_____ State_____

New marketing assistance for

New Basic Market Map . . . an essential adjunct to any marketing program. Emphasizes the 86 industrial areas in 20 states accounting for more than 90% of metalworking plant employment. No trouble visualizing sales areas because the big markets are printed complete with latest plant and employment figures.

New Basic Metalworking Data . . . for years the most popular private census of the metalworking industry, now your key to The Smart Sell in the Sixties. You can concentrate your sales efforts on the plants that pay off by taking advantage of this latest information on every metalworking plant with more than 20 plant workers in the nine important metalworking industries. Data are summarized nationally, by states, and by industrial area. Plants are listed by 2, 3, and 4-digit SIC codes with actual employment figures. There's complete information on secondary producers in each 4-digit SIC group by industrial area. And plants are tabulated for all basic metalworking operations.

But there's more to marketing than the figures. Iron Age marketing and sales techniques are field-proved. They've been used for years by outstanding companies to locate markets, establish market potential, analyze distribution channels, set-up sales territories, and measure sales performance. These down-to-earth marketing techniques are set forth in detail in the encyclopedic introduction to the new volume of data. An unequalled text in practical shirtsleeves marketing, the introductory section is being reprinted separately for wider distribution through your company.

The Smart Sell

Two New Master Lists of metalworking plants bridge the gap between market research and sales planning . . . helping you convert the statistics describing your markets into the names, addresses, and characteristics of flesh and blood companies. If you purchase the Master List, you'll receive two volumes. One, arranged by company name, is ideal for coding sales records. The other, is arranged by SIC codes, then alphabetically by states, for converting statistics into prospects. And the price includes annual updating.

Automated Market Planning is yours with the Master List on IBM cards . . . at least to the extent of sorting and tabulating the necessary statistics. Once you decide on the market characteristics, you can have IBM equipment build a prospect list on the basis of industrial area, geographical location, primary or secondary products, employment code plant workers, departments operated, or any combinations. The new two-card deck includes departments operated, has 44 open columns you can use for coding your own sales information. Like the Master List, purchasing the cards includes annual updating.

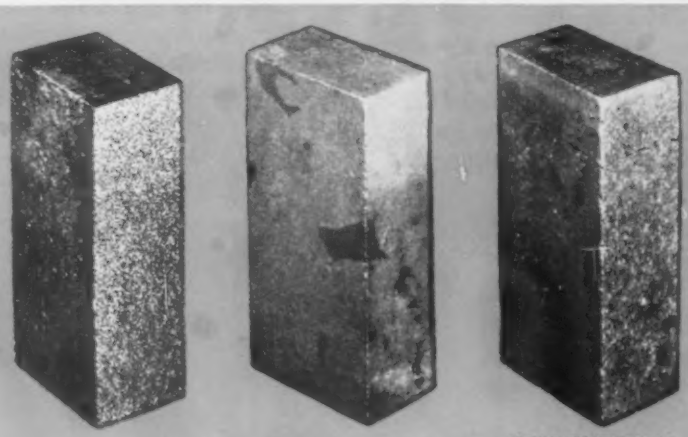
IRON AGE

$

a chilton publication

There you have the barest essentials of the Iron Age 1961 Market Planning Package. *Not just a theory . . . not just numbers, but a practical, proved basis for your marketing program to metalworking. Get in touch with your local Iron Age representative, for details. Or, write Iron Age, 56th & Chestnut Streets, Philadelphia 39, Pa.*

INCREASED RESISTANCE TO SPALLING



VEGA HP | STAR DASH | CONVENTIONAL SILICA BRICK

Heated at rates which break up conventional silica brick, VEGA HP and STAR DASH show no evidence of cracking or spalling.

DEMONSTRATED BY HARBISON-WALKER SILICA REFRACTORIES

The results of these tests indicate a most important advance in the properties of silica refractories. Here are two examples of actual performance.

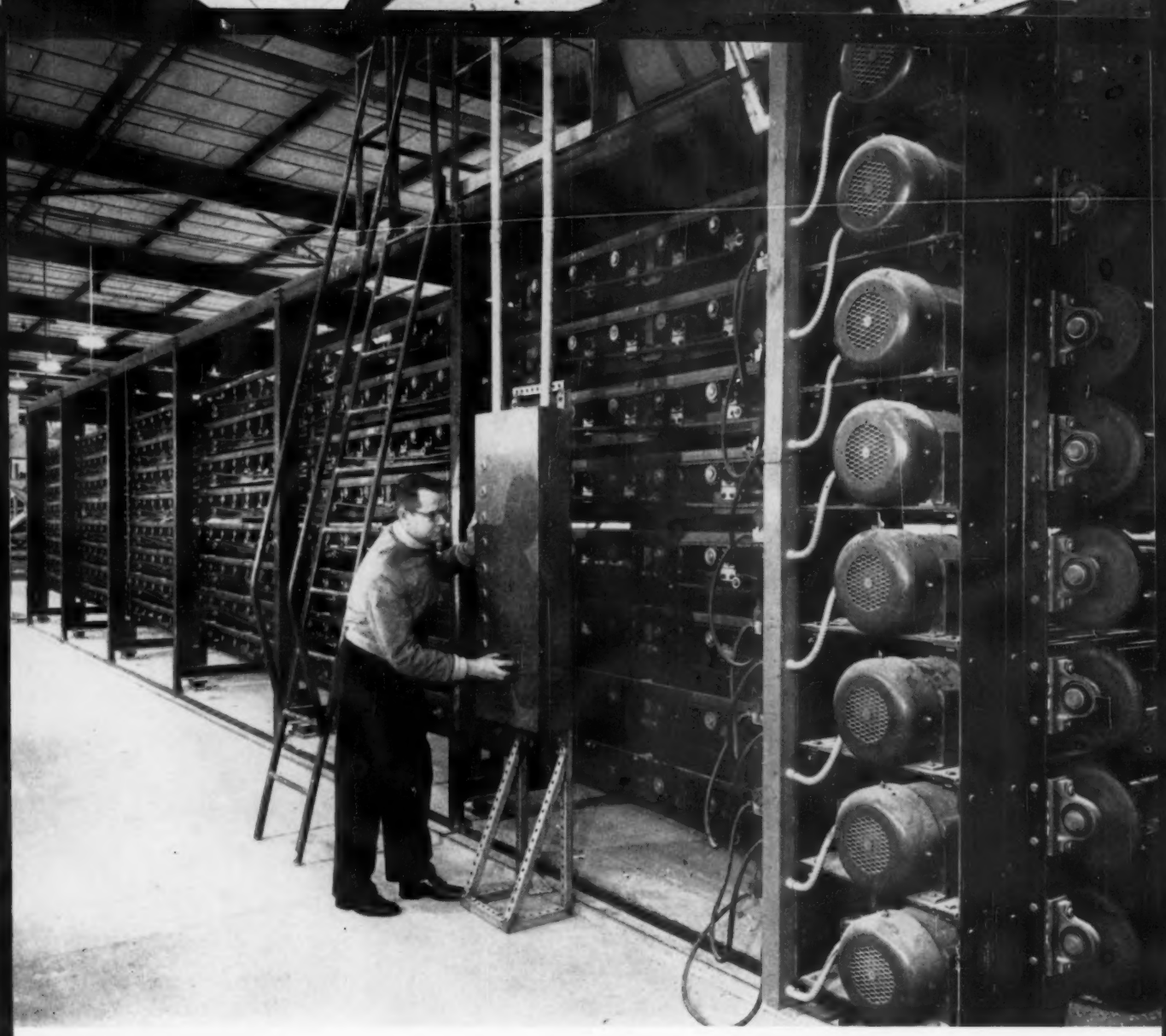
VEGA HP In one open hearth shop, average roof life was increased from 100 to 250 heats by using VEGA HP. The optimum combination of highest refractoriness and spalling resistance resulted in maximum service life.

STAR DASH In a steel foundry electric furnace roof, STAR DASH was used in a lining that lasted 152 heats compared with a previous average roof life of from 75 to 100 heats. This increase in service life is attributed to improved spalling resistance.

The high spalling resistance of these specialized brands suggests other uses—such as in glass plants, tunnel kilns, copper anode furnaces, acid-operated iron cupolas, carbon baking furnaces, heating furnace roofs, and soaking pits. Write for details.

HARBISON-WALKER REFRACTORIES CO.
AND SUBSIDIARIES
GENERAL OFFICES: PITTSBURGH 22, PENNA.
World's Most Complete Refractories Service

HW-61-4



Century motors provide continuous operation for oven conveyor

Eight Century 2-horsepower, squirrel-cage, totally-enclosed-fan-cooled motors accelerate materials onto an 8-deck feed-in conveyor at precise feed-in speeds.

At the end of this conveyor system is an oven. Materials must enter this oven at continuous speeds, and materials must be delivered to the oven constantly during each plant shift. A comparable 8-deck conveyor system is at the other end of the oven to remove the baked materials for cooling and stacking.

These eight Century motors assure the continuous flow operation pictured here. Top-quality Century motors provide the dependability required for long hours of stop-start operation.

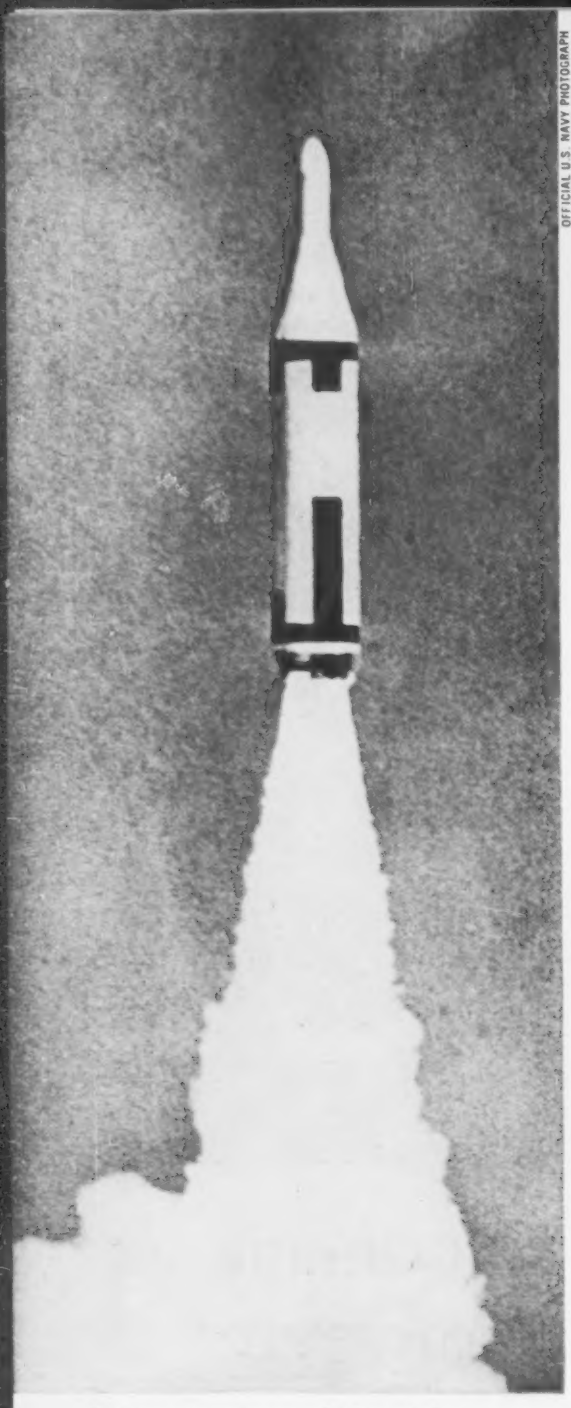
Your Century sales and application engineer, a full-time motor specialist, can help you choose the right motor for your needs from Century's full line of from 1/20 to 400-horsepower motors. Just contact him or your authorized Century motor distributor.

CENTURY ELECTRIC COMPANY

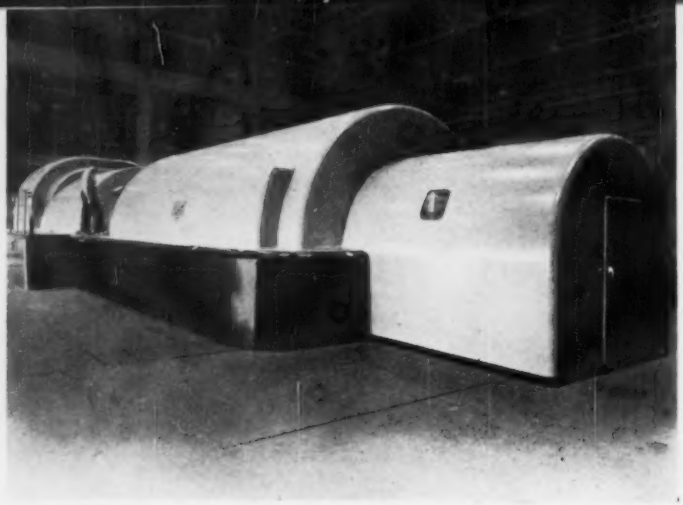
St. Louis 3, Missouri *Offices and Stock Points in Principal Cities*

Century

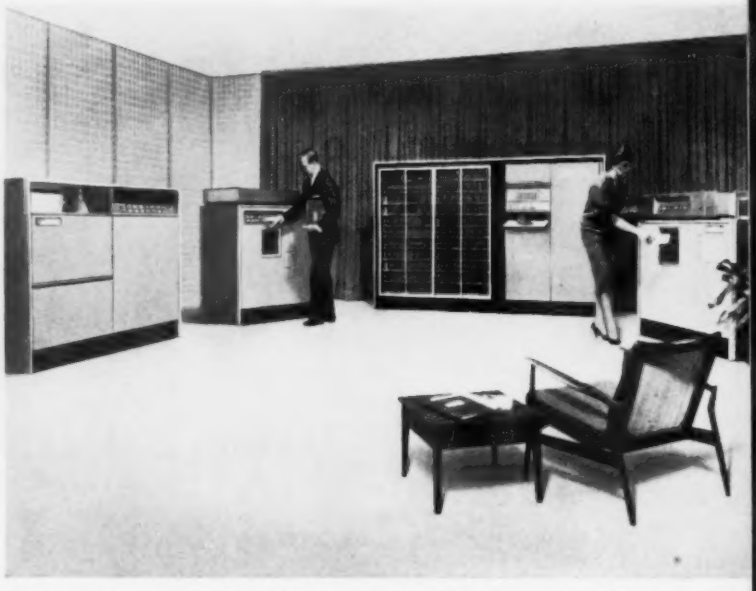
60-12



Three quarters of the globe serves as launching pad for this Polaris missile designed for subs. Carpenter Stainless forgings assure predictable performance.



Less heat, more power. Hydrogen gas cooling system on this fully super-charged steam turbine-generator uses thin-walled rectangular stainless tubing. For extra strength, uniformity Carpenter Stainless Type 304 was specified.



The "big brain". Carpenter Electronic Alloys provide vital links in these advanced solid-state computing systems. Example: Carpenter HyMu "80" strip is used for pickup heads to help guarantee the necessary high reliability.

Steel

you can do it consistently better with

The Carpenter Steel Company, Main Office and Mills, Reading, Pa.

High flying hybrid. "Blucket" is half fan blade, half turbine bucket. Made from Carpenter High Temperature Alloy V-57, "bluckets" are used in new jet engines for the world's fastest airliner. Here Carpenter quality provides extra measure of safety.

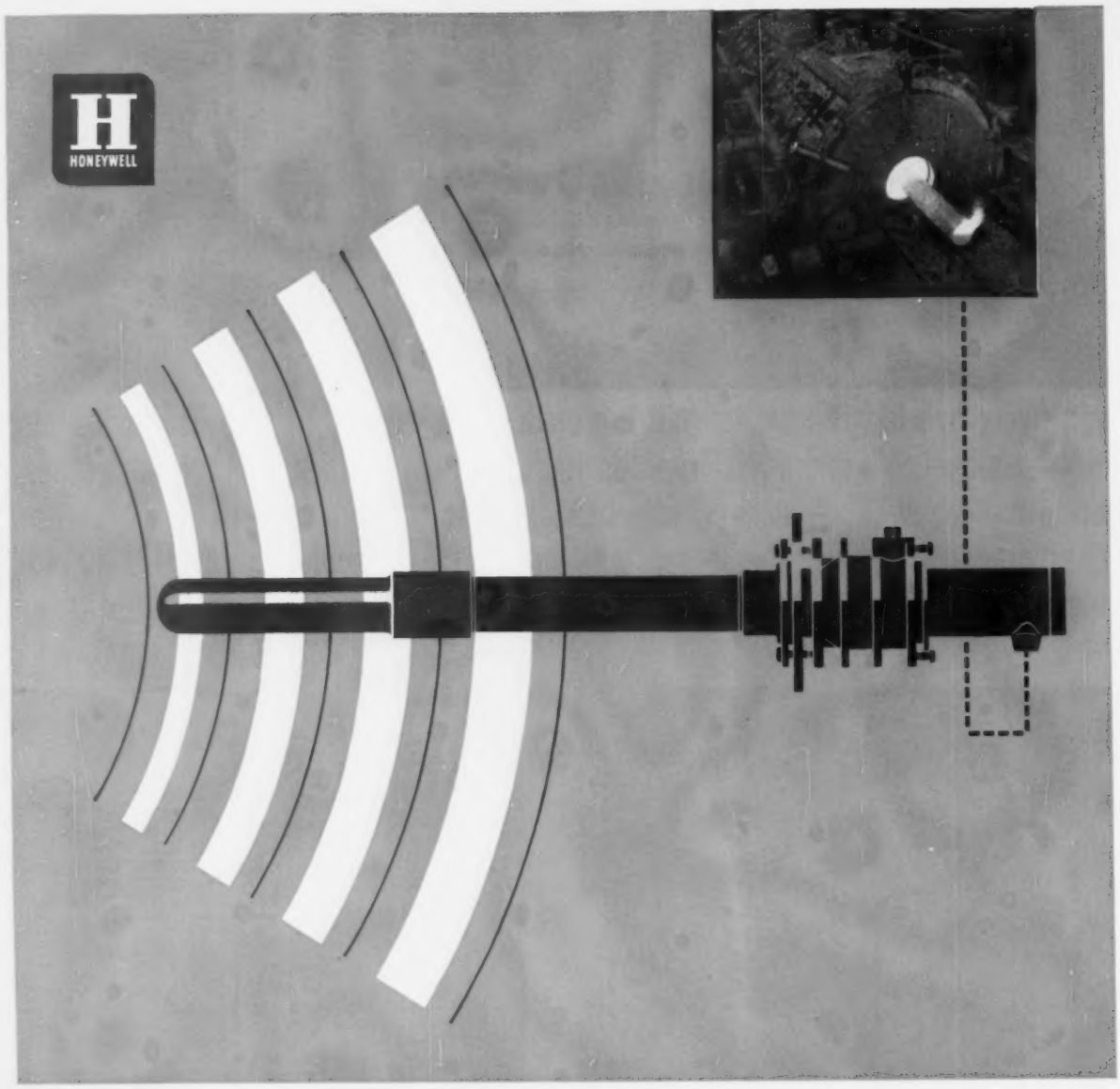
$50,000 toys. That's the cost of tooling up for one of these scale models. Manufacturer specifies "Carpenter No. 484 Tool Steel—no substitute."

Smiles and miles. Joy to pedal pushers everywhere are these bicycle speedometers. Pointer shafts must be reliable ... are manufactured from Needle Wire from Carpenter's Webb Wire Division.

Coast to coast off-the-shelf specialty steel service is available in wide range of sizes and grades. Over twenty fully-stocked Carpenter SERVICE-CENTERS ...all staffed by trained specialists.

Carpenter Specialty Steels for Specialists

Alloy Tube Division, Union, N. J. / Webb Wire Division, New Brunswick, N. J. / Carpenter Steel of New England, Inc., Bridgeport, Conn.



Specify Radiamatic Infrared Detection Systems for dependable, economical temperature measurement and control

For more than 20 years, Radiamatic Infrared Systems have been giving reliable, accurate service in every area of industrial temperature measurement and control. Over the years, Honeywell has developed special infrared techniques and equipment for a wide range of applications, including soaking pits, kilns, heat treating, induction and forging furnaces.

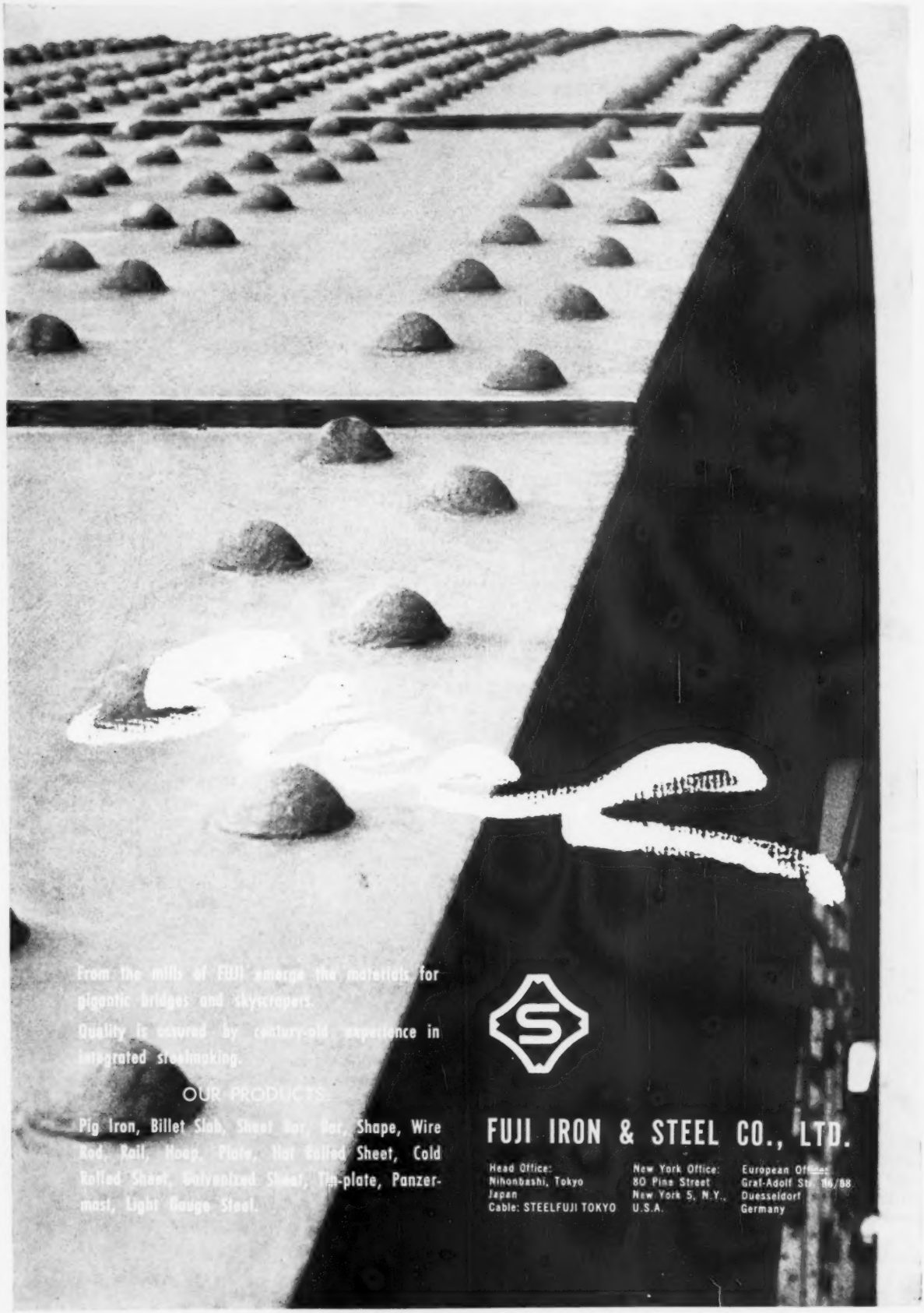
The key to the high accuracy and low cost of these systems is the Radiamatic Infrared Detector. Available in many different models with a full line of accessories, these detectors measure temperatures from 200°F. up to 7000°F.

For complete information on how Radiamatic Infrared Systems can solve your temperature measurement and control problems, call your nearby Honeywell field engineer. Or write Minneapolis-Honeywell, Wayne and Windrim Aves., Philadelphia 44, Pa. In Canada, Honeywell Controls, Ltd., Toronto 17, Ontario.

Honeywell

H First in Control SINCE 1885

HONEYWELL INTERNATIONAL Sales and Service offices in all principal cities of the world. Manufacturing in United States, United Kingdom, Canada, Netherlands, Germany, France, Japan.


From the mills of FUJI emerge the materials for gigantic bridges and skyscrapers.
Quality is assured by century-old experience in integrated steelmaking.
OUR PRODUCTS
Pig Iron, Billet Slab, Sheet Bar, Bar, Shape, Wire Rod, Rail, Hoop, Plate, Hot Rolled Sheet, Cold Rolled Sheet, Galvanized Sheet, Tin-plate, Panzermast, Light Gauge Steel.
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European Office:
Graf-Adolf Str. 86/88
Duesseldorf
Germany

PRECISION is the watchword during every step in the manufacture of Blaw-Knox Rolls. This extra care at every step, maintained by constant close inspection, is your assurance of rolls having the exact properties, dimensions, and finish for maximum service in the stand.

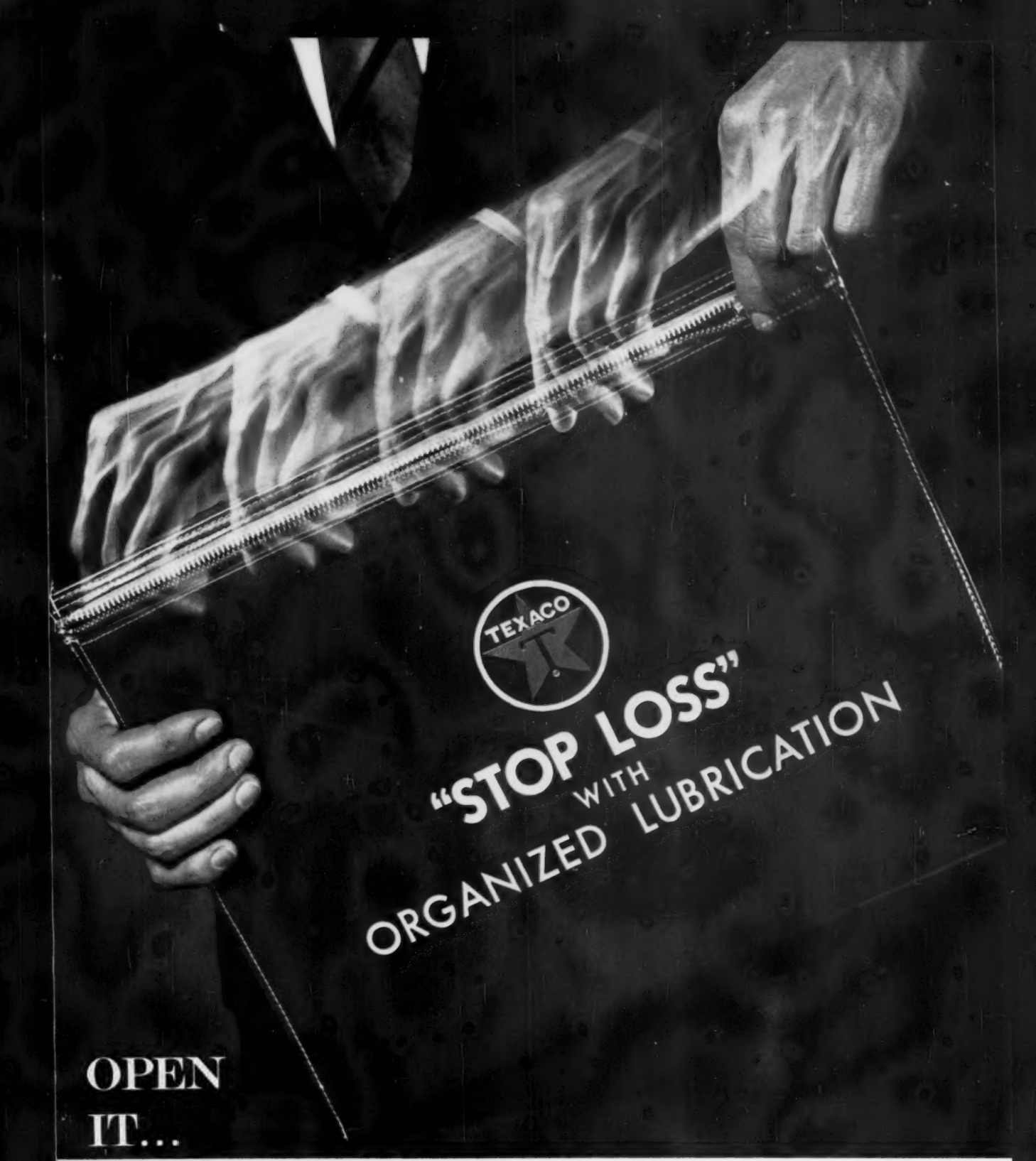
Our rollmakers have more than a century of close association with the metal rolling industry in the development and manufacture of rolls to meet the most rigid service requirements.

Blaw-Knox Roll Engineers welcome the opportunity to join with you in selecting rolls of the proper grade and design for your operations.

Blaw-Knox Company, Foundry and Mill Machinery Division, 300 Sixth Avenue, Pittsburgh 22, Pennsylvania.

BLAW-KNOX

ROLLS



FOR UP TO 4% EXTRA NET PROFIT

In the Texaco man's briefcase is a plan for cost control through organized lubrication—Texaco's "Stop Loss" Program. Management in many different industries is already using it to cut operating costs. The resulting savings go directly into profits. Up 4% is the average. To find out how you can turn excessive costs into profit, write for our informative folder: "How to Starve a Scrap Pile." **TEXACO** INC., 135 East 42nd Street, New York 17, N. Y. Dept. IA-200

TEXACO

New technique makes possible easy-to-machine steel extrusion dies from molybdenum

At 4600°F thorium becomes a liquid. Bismuth boils. Antimony vaporizes. But molybdenum remains hard.

To help you take advantage of molybdenum's hardness—and heat resistance—Sylvania now makes available molybdenum for forging into extrusion dies for steel, titanium and other metals. Thanks to its new isostatic pressing and sintering operation, molybdenum powder of controlled particle size can be formed into forging blanks that permit you to produce intricate shapes and patterns for your dies. Because of molybdenum's high temperature characteristics, these dies far outlast conventional dies. Sylvania also produces billets and ingots for forging, electrodes for arc casting, blanks for machining and machined parts.

Shouldn't you consider refractory metals in meeting your needs? The same properties that solve the problems of throat inserts for rockets and missiles can work for you in piercing points, die-casting dies and cores, in truing grinding wheels and in many other ways. For the full story or help in checking out a special idea write Chemical & Metallurgical Division, Sylvania Electric Products Inc., Towanda, Pennsylvania.

SYLVANIA

SUBSIDIARY OF

GENERAL TELEPHONE & ELECTRONICS

GENERAL SYSTEM

airborne crane built 500 pounds lighter with USS TRI-TEN High-Strength Low-Alloy Steel

Lightweight crane built strong with USS TRI-TEN High-Strength Low-Alloy Steel. Designed for the U.S. Army Corps of Engineers, Ft. Belvoir, Virginia. Builder: Koehring Co., Milwaukee, Wisconsin.

This air transportable, air droppable U.S. Army crane had to be strong enough to lift 7 tons but light enough to be parachuted into a combat area. The Koehring Company of Milwaukee, Wisconsin, solved the problem with USS TRI-TEN High-Strength Low-Alloy Steel.

By using USS TRI-TEN Steel in the turntable, the lower works of the cruiser, and the boom, Koehring designers used only two tons of steel . . . with a clear saving of 500 pounds. Strength was not sacrificed because USS TRI-TEN Steel has a minimum yield point of 50,000 psi.

USS TRI-TEN Steel is well known as one of the most weldable and toughest high-strength low-alloy steels in the industry. Its superior notch toughness at low temperature makes it ideal for all-weather mobile equipment. TRI-TEN Steel has excellent weldability, good resistance to abrasion, and high atmospheric-corrosion resistance.

For other military vehicles, United States Steel makes extremely tough, rolled alloy armor plate, in addition to a complete line of high strength steels, "T-1" Constructional Alloy Steel, Stainless Steels and carbon steels. For more information, write United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania. USS, "T-1" and TRI-TEN are registered trademarks

United States Steel Corporation • Columbia-Geneva Steel Division • National Tube Division • Tennessee Coal & Iron Division • United States Steel Supply Division • United States Steel Export Company

This mark tells you a product is made of modern, dependable Steel.

USS United States Steel

Inspector measuring pole face gap to a tolerance of ±.005".

Yoke made of five forgings held together with dowels loaded to 350,000 pounds tension by a hydraulic bolt stretcher.

This mark tells you a product is made of modern, dependable Steel

259-ton magnet forgings for new 10^{15} (million billion) particles/second cyclotron

This 88-inch spiral ridge design cyclotron will permit nuclear explorations which heretofore have not been possible. The spiral ridges produce greater phase stability, prevent waste of energy. They keep the particles in focus at the tremendous speeds that are built up.

The beam current (number of particles accelerated in a given time) will be about double that of one world-famous 60-inch cyclotron and about 1,000 times that of the 184-inch synchro-cyclotron. Some million billion particles a second will be controlled by the intense, precision magnetic field created by this electromagnet.

The new machine will accelerate a variety of particles. Alpha particles (the nuclei of helium atoms) will reach a maximum of 120 million electron volts (MEV); deuterons (the nuclei of heavy hydrogen atoms) 60 MEV; and protons (the nuclei of ordinary hydrogen atoms) 30 MEV.

To meet the stability and precision requirements, designers turned to forgings. The USS Quality Forgings seen in the pictures represent about 305 tons of parts that were forged on our 10,000-ton press. After extremely accurate machining the total assembly weighed 258.8 tons.

To match magnetic properties, the pole pieces had to be from the same heat of low carbon steel, and they had to be machined, ground and polished to $\pm .005''$. The pole faces had to be parallel to within $\pm .005''$ over their entire surfaces. Steel for all 18 forgings was melted, forged, machined, heat treated and inspected at our Homestead Works. We also furnished dowels $3\frac{1}{2}''$ in diameter, hardened to Rockwell C 35 to 40, which were loaded to 350,000-pounds tension when the forgings were fastened together.

No matter what kind or size of USS Quality Forgings you buy, you get the advantages of the finest steel, the most modern equipment and the most skilled forging men in the world. Please address inquiries for our free folder on nuclear forgings to United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

United States Steel Corporation • Columbia-Geneva Steel Division • Tennessee Coal & Iron Division • United States Steel Export Company

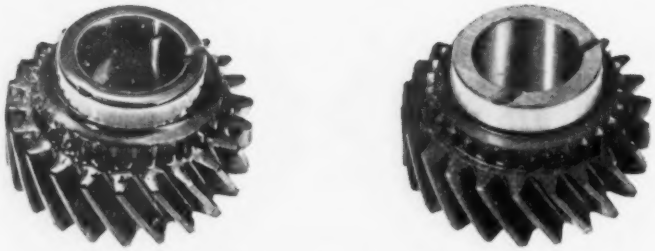
USS TRADEMARK **United States Steel**

Water-soluble cleaners make safe, efficient replacements for solvents

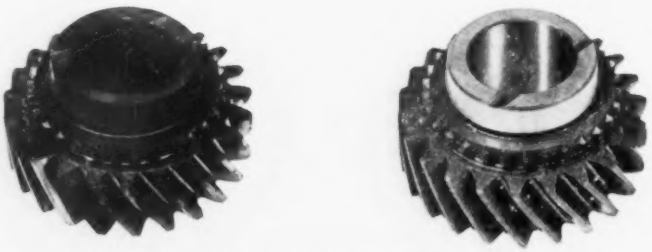
Many of the metal cleaning jobs which have been done with petroleum solvents can now be done as efficiently—if not more so—with the new high detergent cleaners now available. Though solvents are highly effective in the removal of mineral or vegetable oil deposits, they are ineffective on inorganic residues. They are also highly flammable and extreme precautions must be taken to prevent the fluids or fumes from ignition.

Another of the precautions necessary with many solvent type cleaners is protecting workers from the toxic vapors. Open tank equipment must be kept covered when not in use.

Immediately after parts are cleaned with these solvents, a rust preventive must be applied since they provide no protection and corrosion will occur in a few hours even in a moderately dry atmosphere.



Finish machined gear before and after immersion in Cerfa-Kleen CST.



Heat treated gear before and after cleaning in Cerfa-Kleen HPW.

Detergent cleaners for machining

It has been common practice for machine tool operators to have a pan of cleaner handy to permit cleaning of parts for checking purposes. This function can be performed by a water-soluble, highly detergent cleaner such as Houghton's Cerfa-Kleen CST. To provide efficient dip cleaning, only 6 to 12 ozs. per gallon of water are required. Toxicity and fire hazard are eliminated and both organic and inorganic soil are efficiently removed.

For power washer cleaning of machined parts, a cleaner such as Cerfa-Kleen HPW is remarkably effective. This mildly alkaline compound works best at temperatures between 150°F. and 185°F. and at concentrations of only ½ oz. to 2 ozs. per gallon of water. Fire danger and toxicity are overcome and a built-in rust preventive provides adequate protection between operations.

Cleaning after heat treating

Because of the efficiency of the new high detergent-alkaline cleaners, the inorganic soil deposited on parts in the heat treating process can be easily removed and rust protection provided in one operation. Here again, a product such as Cerfa-Kleen HPW will do an outstanding job. Through a powerful bi-phase detergent action and mild alkaline action, this product provides the ultimate in cleaning efficiency.

Years of experience by Houghton in the cleaning problems of the metalworking industry has led to the development of the four new Cerfa-Kleens. These four fill the needs of the great majority of plant operations. For detailed information, call your nearby Houghton Man or write E. F. Houghton & Co., 303 W. Lehigh Avenue, Phila. 33, Pa.

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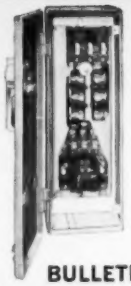
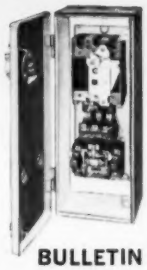
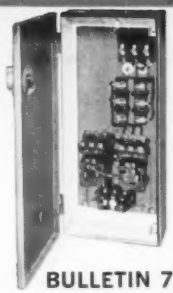


BULLETIN 712
Size 1 combination starter with fused disconnect switch



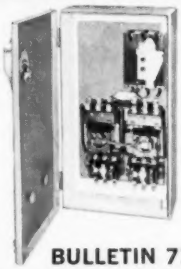
BULLETIN 713
Size 1 combination starter with circuit breaker

BULLETIN 705
Size 2 across-the-line reversing starter with overload relays

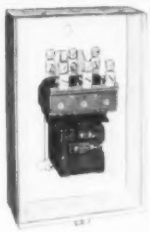


BULLETIN 706
Size 1 reversing starter with fused disconnect switch

BULLETIN 715
Size 1 across-the-line, multi-speed starter with overload relays



BULLETIN 717
Size 2 multi-speed starter with circuit breaker



BULLETIN 702
Size 3 three-pole, a-c solenoid contactor

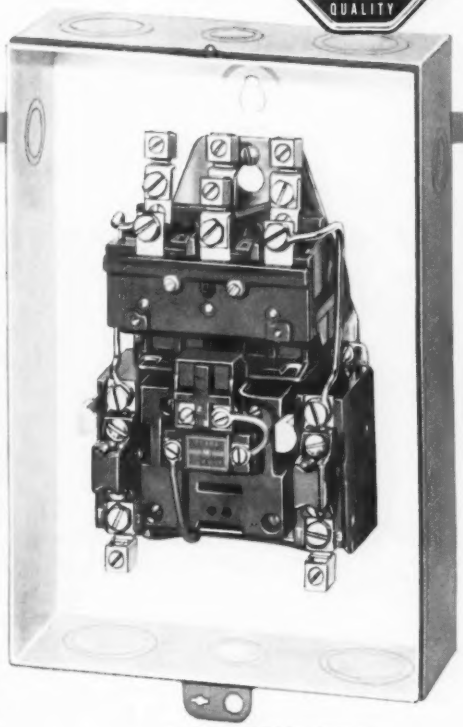
Pygmies in Size
Giants in Performance—
the NEW Allen-Bradley Across-the-Line Starters!

This new line of across-the-line motor starters is the result of over 30 years of experience and leadership in the motor control field.

While retaining the simple solenoid principle—with only ONE moving part—these starters are completely new in every way. They are amazingly small in size—yet test after test has proved they will not only outperform but also outlast any starter now on the market. They are good for *many millions* of trouble free operations. All have scores of design refinements that make them easier to install and maintain. All are available in the smart new enclosures designed by Brooks Stevens. They make a beautiful addition to any machine or control installation.

You'll want to get the complete story about these truly revolutionary new across-the-line starters. Write for new Publication 6100.

A-B QUALITY



BULLETIN 709

This popular across-the-line solenoid starter shows the new Size 2 construction. Note the white interior and generous wiring space. Bulletin 709 starters are available, in the new construction, in seven sizes—Sizes 00 to 5, with a maximum rating of 100 hp, 220 v; 200 hp, 440-550 v.

11-61-RM

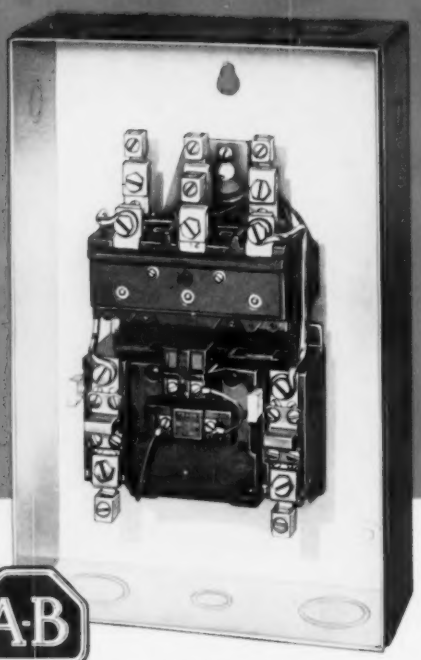
ALLEN-BRADLEY

Member of NEMA

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.

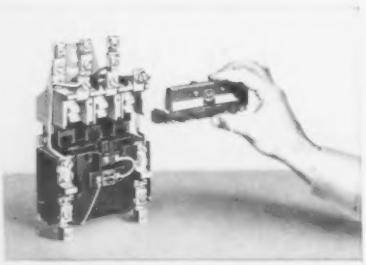
QUALITY MOTOR CONTROL

Features of the NEW Allen-Bradley starter line that are of value to you!

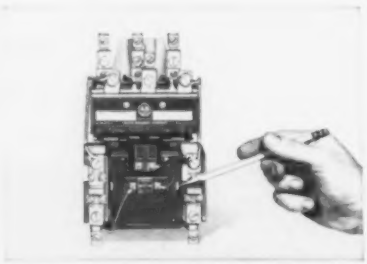


New Bulletin 709 Size 3 across-the-line motor starter. Note the generous space for wiring, accessible terminals, and white interior.

Every detail of the new Allen-Bradley motor starters has been designed to help make this the best line of motor control on the market. Remarkably small in size, each starter is a giant in performance. Being light in weight, these starters are easy to handle and a cinch to install. The generous wiring space, full front wiring, white interiors, and convenient knockouts make installation easy. The enclosure cover is firmly held with a quarter-turn fastener. All installation, inspection, and maintenance operations can be handled from the front—as shown in the illustrations below—without the use of special tools.

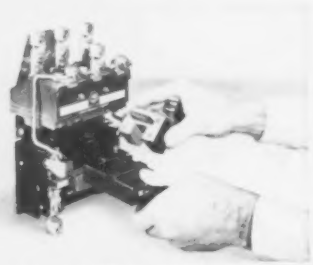


QUICK, EASY CONTACT INSPECTION—When the arc hood front cover is removed by loosening two captive screws, contacts are plainly visible from the front.

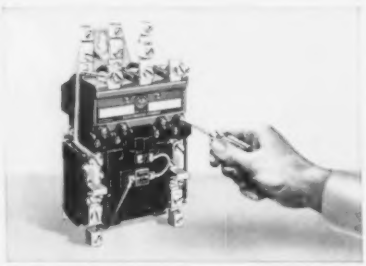


CONTACT POSITION INDICATED—Two slots in the coil cover show the position of the movable contact support—tell whether contacts are "closed" or "open."

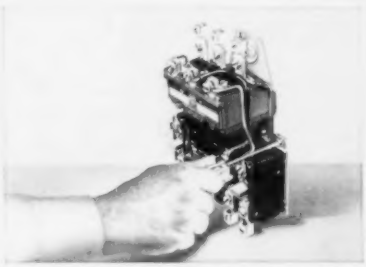
CONTACTS EASILY REPLACED—Depress the spring slightly, and the movable contacts can be lifted out of the molded support and the new contacts slipped in.



COIL EASILY CHANGED—When the coil cover is removed, coil and magnet yoke can be lifted out from the front. They are impossible to replace incorrectly.



AUXILIARY CONTACTS EASILY ADDED to the front of the starter. Two extra auxiliaries can be added to Sizes 0, 1, and 2 starters, and four, to Sizes 3, 4, and 5.



A THIRD OVERLOAD RELAY CAN BE EASILY ADDED in the field, from the front of the starter. And the only tool needed is a common screwdriver.

ALLEN-BRADLEY

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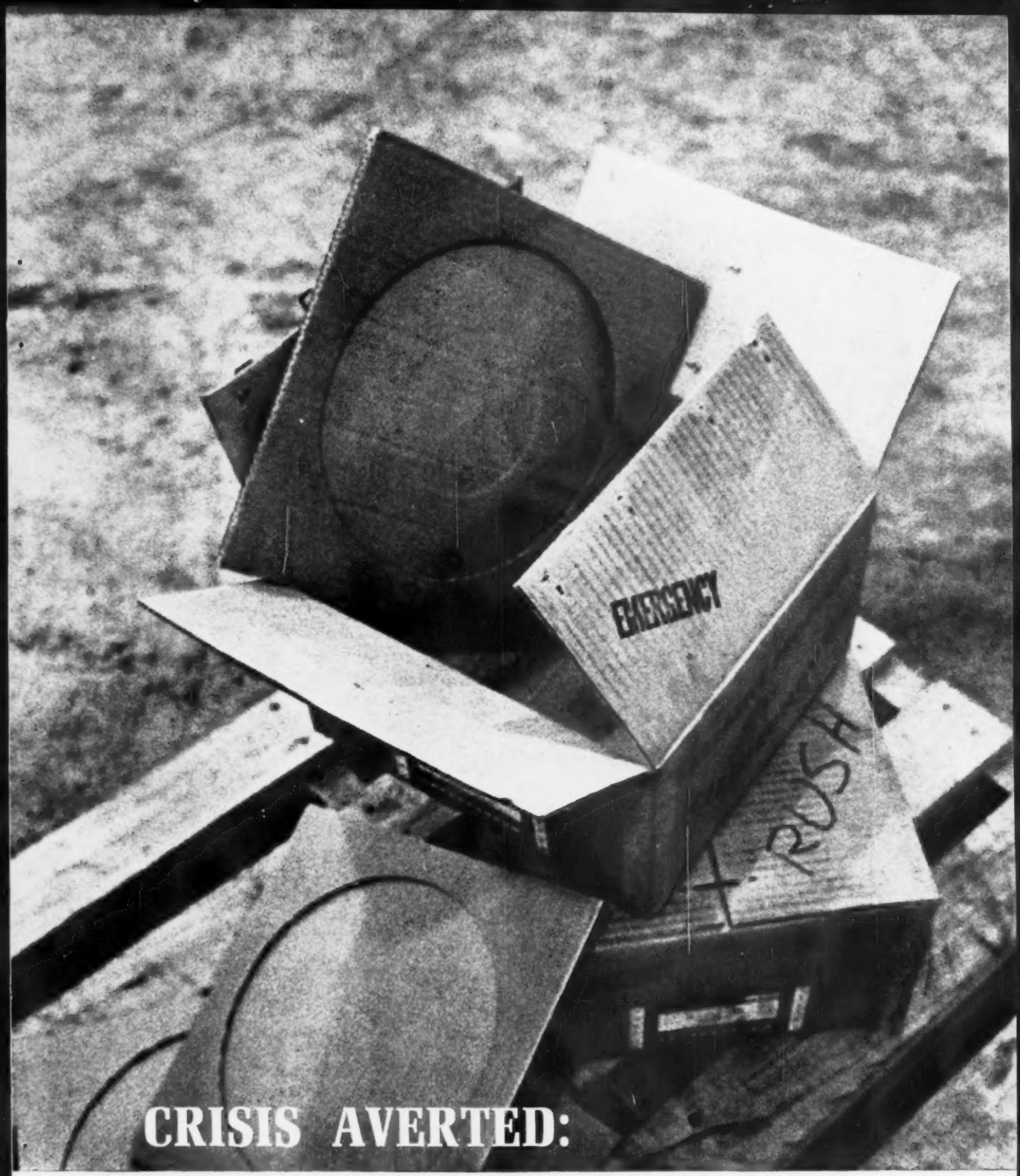
Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.

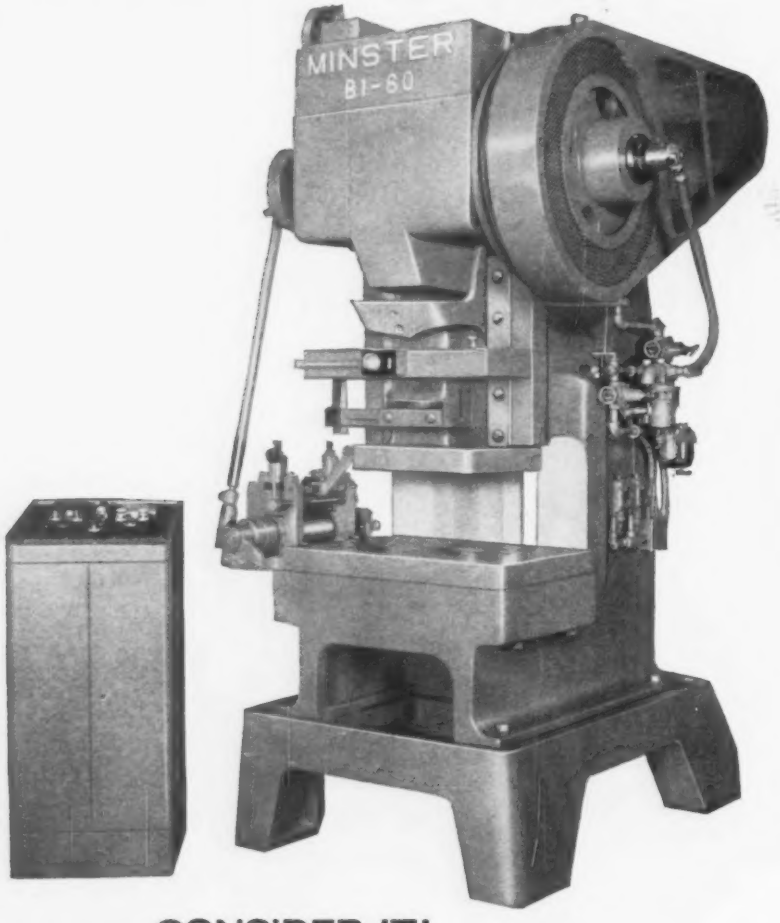
QUALITY MOTOR CONTROL



CRISIS AVERTED:

Not every grinding wheel order springs from an industrial crisis, but when there is a hands-down emergency—when you're in a cross-fire of urgent demand that only an opened container on your shipping dock can satisfy—Carborundum's electronic order processing service can be your answer. By split-second Univac II control, Carborundum can instantly search a nationwide chain of warehouses for the item you need—place it under teletype order for air shipment—slam the door in the face of crisis. For your critical items . . . as for your everyday requirements . . . Carborundum is your key to superior abrasive service. **CARBORUNDUM**

If you make small parts in large volume....
this B1 press probably will make them faster,
more accurately and at lower cost per part.



CONSIDER IT!

Improvements in tooling and production technology have led to higher speeds, more intricate dies and multi-stage operations. Minster anticipated the industry's need for a press specifically designed for high speed, small parts stamping. We were best prepared to develop such a press. Minster B1 presses have greater stability, precision and rigidity to do the job. Capacity range is 16 to 60 tons . . . proper feed equipment available to match your job. Ask a Minster representative to show you why a B1 press is superior.

The Minster Machine Company, Minster Ohio

MINSTER®

AIR CONDITIONING OF CARS in the low priced field is becoming more popular this year. This is true for all parts of the country. Plymouth reports a 52 pct rise in rate of orders in 1961 models compared to last year. Although biggest gains are on the West Coast (about twice last year's), and the South (up two-thirds), there is a one-third gain in other areas.

HOME BUILDERS are meeting in Washington to study expansion possibilities in the home remodeling field. This is already a $5 billion annual business. And Congress is working on legislation to up long-term home improvement loans.

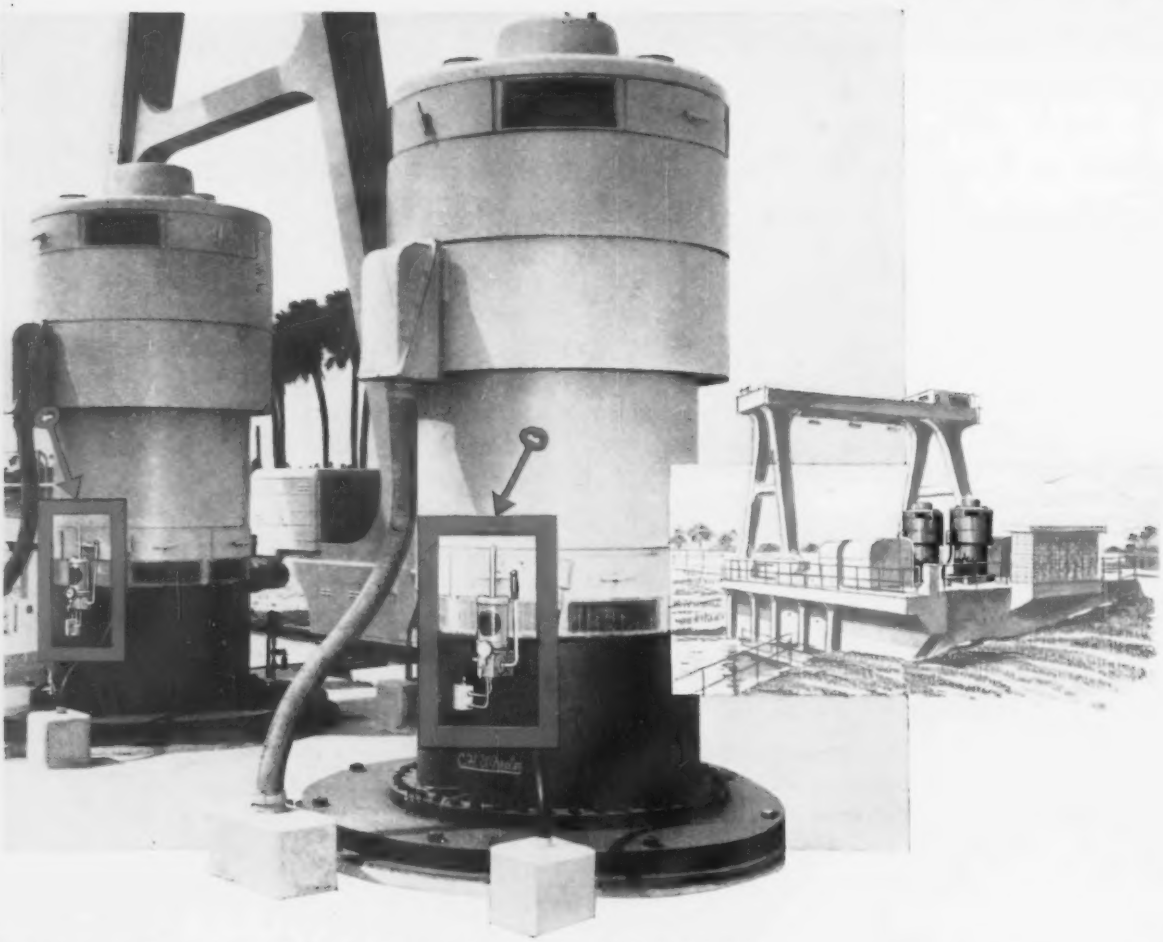
PROBLEMS HIT THIN TINPLATE. Production snags are hitting mills using interim methods and still trying to meet heavy demands for conventional stock. Thin tin must be given a second run through electrolytic lines. There is no added coating but coils must be cleaned again to remove oils picked up in final cold reduction. Separate cleaning facilities are seen going in soon.

INVENTORY REBUILDING is now going on at a stepped-up pace. An analysis by the National Assn. of Purchasing Agents shows stocks approaching year-ago levels. Less shopping for fast deliveries on smaller orders can be expected as buyers become convinced the turn has come. Surveyed buyers indicate a belief that the "strongest post-recession rebound in recent history is occurring."

A RISE IN PRESS SALES is reported. While job shop buyers of presses are still dragging heels on new equipment purchase plans, large captive shops have begun active buying. Noted earlier in the Midwest, the trend appears widespread. Backlogs don't yet show the upward movement in sales, say some pressmakers.

MORE CARS WERE SOLD by General Motors Corp. in the first 10 days of May than in the same period of May since 1956. GM dealers sold 85,000 cars during the time, compared to 91,000 in 1956.

GRAY IRON FOUNDERS report operations in April were at 60 pct of "ideal" capacity. This is the same rate as reported for March. But normally, April shows a slight fall-off from March. Of 212 foundrymen surveyed, 93 expect May shipments to be up over April; 24 see a decline, and 95 forecast shipments unchanged.



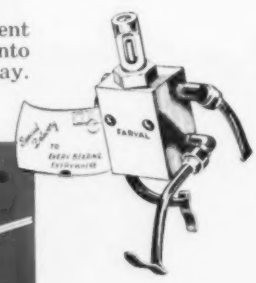
Farval centralized lubrication guards against breakdown of condenser circulating water supply

Once again, two dependable, manually operated Farval Centralized Lubricating Systems were chosen to help keep these C. H. Wheeler mixed flow condenser circulating water pumps operating at a top capacity of 45,000 GPM.

These pumps are most vital to operation of the intake station (shown in sketch) that supplies condenser cooling water for the Orlando Utilities Commission's new Indian River Power Plant in Florida.

Two modern, engineered-for-the-job Farval Systems deliver measured amounts of lubrication, under pressure, to all pump shaft bearings . . . preventing wear, overheated and ruined bearings. This permits maintenance down time to be kept to a minimum and eliminates possibility of bearing failure with subsequent station shutdown.

Remember, for the ultimate in bearing protection on all types of machines and equipment —Farval is the cost-cutting answer. Get the latest information on how Farval can fit into your production picture—it's in free Bulletin No. 27. Write us for your personal copy, today.



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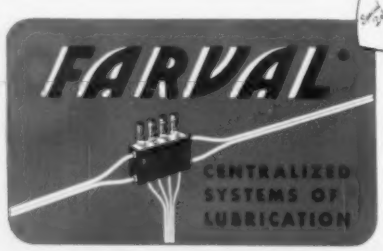


KEYS TO ADEQUATE LUBRICATION

Wherever you see the sign of Farval—the familiar valve manifolds, dual lubricant lines and central pumping station—you know a machine is being properly lubricated.

Farval Studies in Centralized Lubrication No. 253

Everyone Raps Tax Credit Plan

Business, Labor and Others Agree It's Not the Answer

President Kennedy's tax credit plan is getting rough treatment and little support from those whom it is supposed to help.

Industry would like to have the entire tax mess overhauled. By R. W. Crosby

■ Metalworking interests are unanimous in their opposition to President Kennedy's tax credit plan to spur industrial investment in new plants and equipment.

Testifying at House Ways and Means Committee hearings, metalworking industry representatives joined almost all business witnesses in rejecting the "half-a-loaf" approach to industrial tax reform.

Rep. Wilbur D. Mills (D., Ark.) and his Ways and Means Committee heard the tax credit plan called everything from "inequitable" to "unrealistic."

Asked for It—What, then, does industry want, Rep. Mills and his committee asked again and again. They knew the answer; they got it.

The answer: Liberalized depreciation.

Changes in present depreciation regulations are considered the "whole loaf" approach by industry. Witnesses admitted that perhaps "half-a-loaf was better than none." But they made it plain, too, that as long as the depreciation loaf was still possible, they would not accept the half-a-loaf tax credit.

And while they were making things plain, the witnesses expressed equal, if not more, opposition to the section of the Kennedy tax program which would end capital gains treatment on gains from the sale of depreciable property.

EYE-TO-EYE: Joel Barlow, U. S. Chamber of Commerce, (left) and Rep. Wilbur D. Mills met before hearings on the tax credit plan. But once inside, Mr. Barlow didn't see eye-to-eye with the President's plan.

The Consensus—One after another, metalworking spokesmen took the rostrum and spoke their piece on the tax credit plan.

Joel Barlow, longtime metalworking spokesman, testifying for the U. S. Chamber of Commerce, expressed the consensus: "A tax credit provision that is so discriminatory, complex, and uncertain in rate and application, is not likely to provide the general stimulus needed for modernization and growth."

"There is really no substitute for complete and realistic depreciation reform," Mr. Barlow added.

Speaks for Two — William D. Dickey, treasurer of Universal-Cyclops Steel Corp., speaking for his company and for Carpenter Steel Co., questioned the equity and effectiveness of the tax incentive plan. In his words he "strongly opposed the tax credit plan."

The only proposal he could "honestly" support, he said, was liberal-

ized depreciation reform.

Joseph E. Workman, president of Latrobe Steel Co., said tax credits were "a gift" he did not want. "Depreciation reform is the necessary move," he said. "Tax credits are a form of subsidy which we do not want. It would seem that we are being offered a gift package with the hope that we will not then be in position to ask for proper long-term corrective action. We do not want subsidization. We do not want gifts in the form of tax credits."

Support From All Sides—George Terborgh, research director for the Machinery and Allied Products Institute, testified that the Administration's "scheme imposes on management an entirely new range of tax considerations in making business decisions. With the revenue system already overburdened with such considerations, the last thing we need is more of them."

These feelings not only were backed up by other metalworking men. And they received the support of witnesses such as Stanley H. Ruttenberg, director of research for the AFL-CIO; Dan Throop Smith, Prof. of Finance of the Harvard Graduate School of Business Administration; and Morgan Doughton, president of the U. S. Junior Chamber of Commerce.

They Agree—The business representatives told the committee they were pleased that the Administration had recognized that there were deficiencies in the tax structure.

They agreed readily that the nation's economic situation would be helped if business was aided by tax reform.

And they were quick to point out that a program to rid industry of obsolete equipment and bring in new plants and machinery was exactly what they wanted.

But Not to This—But they insisted that there was a better way of doing it than the President's tax credit plan. The reasons why they don't want the plan are manifold. Major points of argument are:

1. The tax credit plan is too complex and difficult to understand and administer. The tax structure is too complicated, already.

2. The tax credit will give preferential treatment to particular segments of industry. The part of industry in a position to make unusually large investments in 1961 would get the most benefit.

For These Reasons — 3. The credit plan is uncertain in its terms, rates, and duration. A program always under review, as this would be, will not create the needed economic stability.

4. The President's plan will delay basic depreciation reform.

5. The credit plan may even have adverse economic consequences, particularly because of the unsettling influence of changing credit allowances.

6. The tax credit plan will not have sufficient rehabilitation stimulus to meet foreign competition from modern equipment and liberal depreciation allowances.

7. The tax credit plan would not be stimulus enough to warrant treating the gains on sale of depreciable property as ordinary income rather than as capital gains.

DICKEY: Strongly opposed.

What They Want—While opposing the tax credit plan, many metalworking representatives found time to get in a word for depreciation legislation already before Congress.

Some gave their support to legislation giving companies the option to use whatever life they think appropriate for newly acquired machinery and equipment. Support also was given to a reinvestment depreciation bill. Here the difference between the original cost and inflated cost of depreciable property is allowed as a deduction when an equal amount is reinvested.

Steel Spokesman—The steel industry's support for depreciation reform over a tax credit system was summed up by Joel Hunter, president of the Crucible Steel Co. He told the Committee:

Investment Tax Credit Plan

The Credits

Tax credits would be available to corporations and individually owned businesses. Credit would be retroactive to Jan. 1, 1961. Investments would be limited to money spent on new plants and equipment, on assets located in the U. S., and on assets with a life of six years or more.

Eligibility

Tax reduction would be allowed up to 30 pct of a company's or businessman's taxes for one year. Reduction could come in the form of: 1. Depreciation; 2. 6 pct of such expenditures below this level, but in excess of 50 pct of depreciation allowances; 3. 10 pct on the first $5000 of new investment as a minimum credit.

The Money

The plan would provide $1.7 billion in investment credits.

"The steel industry needs liberalized depreciation to keep up with the progress of research and development in its own plants which has worked great changes in the art in the last few years."

"Iron and steelmaking processes and methods are constantly being improved," Mr. Hunter said, "and equipment which is quite capable of functioning physically is becoming obsolete.

"For example, the introduction of the use of oxygen in iron and steelmaking processes, and of vacuum melting techniques for certain types of quality steels, makes it imperative that the members of our steel industry provide for those processes without delay if they are to maintain and improve their competitive position with foreign steel producers."

Outside Criticism—From outside the industry came the most damning testimony. Said Dan Throop Smith, Harvard Prof. of Finance:

"The investment credit proposed in the recent tax message is intended to encourage and assist in the financing of additional investment in plant and equipment. The objective is an important one.

"More liberal depreciation on machinery and equipment is, next to rate reform in the individual income tax, the most useful single reform which could be made in the tax law. But, though the objective is extremely desirable, the proposed investment credit appears to be about the worst possible way to achieve the desired and desirable result."

Reform First — Prof. Smith quoted for the committee a conclusion he drew in a book on Federal Tax reform—written before the President's tax plan was formulated. At the end of a rather extensive discussion of tax depreciation in the book, he concluded that:

"The basic reform in regular depreciation rates and simplification in categories (of depreciable property) should be adopted before any experiments are made with new tax gadgets."

Tool Bank Plan Is Under Attack

The tool bank plan of Congressman Frank Kowalski has been hit by used machinery dealers as "fantastic."

The dealers say a more realistic approach is needed.
By B. F. Surer

■ Congressman Frank Kowalski's tool bank plan is under attack by used machinery dealers—especially those concentrating on exports.

Reaction to the much-discussed plan came from the tool dealers last week in Washington. The occasion was an address by Rep. Kowalski before the 20th annual convention of the Machinery Dealers National Assn.

The original Kowalski Bill is arousing interest in Washington. But there have been so many additions and deletions that many used machinery men admit to being "confused." Prior to the convention, Rep. Kowalski told The IRON AGE: "One of the objectives of the tool bank is to move surplus tools out of the Defense Dept. to underdeveloped nations. We should have a program to look at shops, shipyards and arsenals to see what should be pulled out and replaced with new equipment."

From Industry—But the Congressman went one step further when speaking to the used tool dealers. He added that the bank might possibly include tools from private industry too.

Many MDNA members call the proposal "fantastic" and "ridiculous." They argue that this would put used tool exporters in direct competition with the government.

Total sales of U. S. used machines have been very sporadic in recent years (see chart). In fact, according to MDNA figures, there have only been two years since 1955 when sales have topped the levels reached in the late 1940's.

Negative View—Some dealers say the Kowalski Bill, as it now stands, "could put us out of business." Others note that this is a negative view. But they agree it could "hurt severely."

Randy Vinson, executive director, MDNA, says: "The proposal does nothing for us as a group. Because it bypasses us, we plan to present Mr. Kowalski with our idea as to how we could help with this program.

"A function like this should operate through the normal channels of trade."

Another leading toolman notes "This plan should utilize men in the used machinery industry. It should operate to the material advantage of both the government and the used tool dealer."

Arguments — Among the arguments offered by MDNA members are these: The government is already having a difficult time keeping a proper listing of all surplus tools in Federal stockpiles. "How will they keep a listing of industrial tools, also?"

And there is no real foreign relations advantage to the plan, they say. Giving away tools hurts the pride of the underdeveloped nation. What the dealers propose is a program where nations can purchase good, used tools for a very low down payment and with good terms and low interest rates.

Dealers would also desire that the tools be sold directly to the foreign manufacturer "as he asks for them." They claim giving tools to foreign governments doesn't do the job.

Weather Warms Up Car Market

Sales Pick up After Cool Spring; Inventories Climb Again

With unusually cool spring weather ending, car sales are perking up.

The auto industry is now joining in the economic upturn. Production and inventory also are on the rise.

By A. E. Fleming

■ Car sales are warming with the weather.

From the first of the year, the auto market was as cold as the winter that was at least partially to blame for sagging sales. A cool spring did little to warm the enthusiasm of prospective buyers.

But last week brought evidence that the thaw had started: Flowers were blooming and auto buyers were buying.

General Upturn—The auto industry is now feeling a little of the warmth generated by the general economic upturn. And from here on, automakers hope to generate a little heat of their own.

The outlook is definitely "much brighter." This was reported by John Dykstra, president, Ford Motor Co., at Ford's annual stockholders meeting last week.

"Not only does the economy appear to be pulling out of the 1960 recession, but the automobile market has picked up well after a very weak first quarter," said Mr. Dykstra.

Sales Promise—James O. Wright, vice president of Ford's car and truck group, reported the seasonally-adjusted industry annual rate of new cars in the first quarter was only 5.3 million, "a very disappointing beginning for the year."

However, on the basis of recent sales, Mr. Wright said, "it appears likely that the industry can sustain an annual sales rate of about 6 million units for the rest of the calendar year—promising a very satisfactory last three sales quarters in 1961."

Spring Hopes — Since March, auto industry leaders have been banking on a spring sales rise. Improvement began slowly in March and maintained the pace through April. Now it looks like it may be firming a bit.

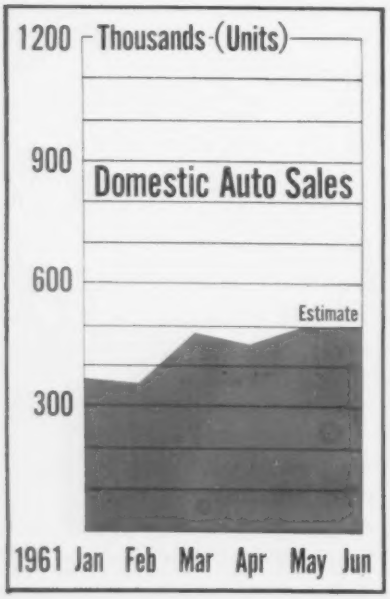
New car sales in the first 10 days of May picked up. Although still at the lowest daily rate of sales in years, total units delivered May 1-10 topped corresponding periods in 1959 and 1960.

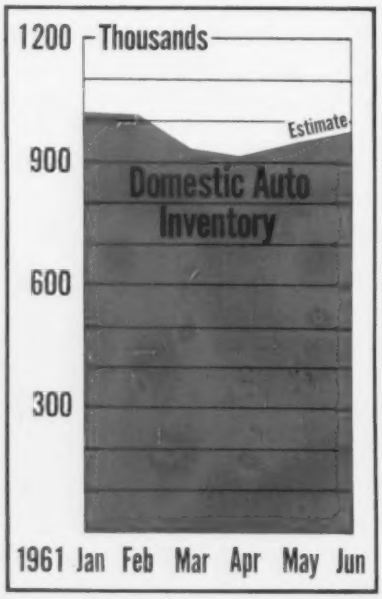
And the margin of differences between 1960 and 1961 was narrower.

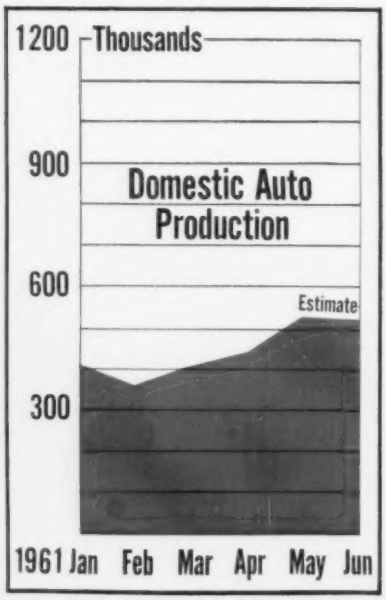
Edge Reduced—Through April, sales in 1961 trailed 1960 by 20 pct. But early in May that margin was cut to 12 pct.

Automakers hope to close the gap in coming weeks. They have set their sights on 500,000 domestic

Buildup Begins: Sales, Stocks, Output Climb







car sales in both May and June. This mark hasn't been hit since the new models were introduced last November.

Stocks Soar—As sales rise, so also do production and inventory. In fact, another round of new car stockpiling is in sight.

Production is pegged higher than expected sales. It is now gauged 60,000 cars higher than May-June sales forecasts.

The new buildup follows a steady slashing of stocks since the first of the year. As recently as March, industry inventory swelled past the 1 million level. By idling plants for a week at a time, automakers lopped over 100,000 cars from the stockpile in March and April. By the end of April there were 913,000 domestic cars in dealerships, lowest level since last September.

Big Month—Now they're climbing again. Indications are the inventory will reach 950,000 by the end of May, and hit 975,000 by the end of June, last big production month for 1961 models.

One reason for the renewed buildup is the rash of new bucket-seat, luxury compacts marketed this spring by Buick, Oldsmobile, Pontiac, Falcon and Comet. Dealers figure these models will go over big.

Labor Trump—Also, with 1 million cars on hand when Big Three-UAW contract negotiations open in late June, the industry will have a trump card to play if a strike is threatened.

In the last two contract years, automakers began bargaining with less cars in the cupboard. In July, 1958, the stockpile was 700,000 units; in July, 1955, closer to 675,000.

Model Changeover—Soon after the labor talks begin, annual model changeovers are due to start.

The automakers hope to get 1962 production rolling before the August 31 deadline on current Big Three contracts. But they won't have time to get in more than a few weeks' work — another reason for the big buildup now.

How Depressed Area Aid Plan Works

Rules under which business may join in area redevelopment work have been set up.

Major type of loans to communities will be for industrial and commercial projects.

■ Loan funds of $200 million are now available for industrial and commercial projects under the new Area Redevelopment Act. And the standards by which industry may join the projects have been set by the new Area Redevelopment Administration (ARA).

The ARA, a Commerce Dept. agency headed by William L. Batt, former Secretary of Labor and Industry for the state of Pennsylvania, will approve area redevelopment programs on the basis of:

1. Eligibility of an area due to unemployment.

2. An overall economic development plan worked out by leaders of the local areas.

Varied Types — The major type of assistance under the Act (signed into law by President Kennedy earlier this month) is loans to communities for industrial and commercial projects. Other types of assistance are: Loans and grants for public facilities; technical assistance; occupational training; and retraining subsistence payments. Funds for the whole program will amount to more than $400 million.

Loans for industrial and commercial projects will finance the purchase of land and facilities, including construction of new buildings and rehabilitation of old or abandoned buildings. Loans may be made for machinery and equipment, too, in cases of demonstrated need.

The ARA says each industrial project is expected to have the support of both public and private interests. They will share the cost with the Federal government. In no case will the Federal government put up more than 65 pct of the share. The interest rate on the Federal loan will be based on the current average yield of U. S. Treasury long term bonds plus one-half of one pct overhead. Right now this amounts to 4⅜ pct.

Requirements Listed—Industrial and commercial loans will be subject to other requirements:

1. Financial assistance shall not be extended for working capital or to establishments relocating from one area to another.

2. Assistance shall be extended only to applicants approved by the agency or instrumentality of the state or political subdivision directly concerned with the problems of economic development.

3. The project must be reasonably calculated to provide more than a temporary alleviation of unemployment.

4. The financial assistance must not be otherwise available from private lenders or other Federal agencies on reasonable terms. And there must be reasonable assurance of repayment.

Other Benefits — Industry will benefit from other parts of the Area Redevelopment Act on a secondhand basis. Some of the other projects and their intent:

Loans and grants for public facilities. The act provides $100 million for loans and $75 million for grants where public facilities are needed for establishment or expansion of specific plants.

Technical assistance grants $4.5 million annually), procurement information, and guidance from the ARA are available to assist in obtaining industrial, commercial or public facility loans.

MOVING OUT: One Volks is shipped from Wolfsburg every 17 seconds. Fifty-seven percent go for export.

Report From West Germany

VW's Nordhoff on World Trade

As president of the Volkswagenwerk, Prof. Heinz Nordhoff heads up the fourth largest automotive company in the world.

In this exclusive interview he presents his views on West Germany's economy, world trade and imports from the U. S.
By E. C. Beaudet

■ **Q. Prof. Nordhoff, last year West Germany's economy ran at a high level. Will the rate of expansion be faster or slower in 1961?**

A. I expect it to be about the same. There is no visible reason for any decline and virtually no possibility for a further increase in the already high rate of expansion.

Q. What is the outlook for new plant and equipment spending in West Germany in 1961?

A. Capital investments are up sharply. Monthly figures for 1961 are about 15 per cent higher than the 1960 figures. This apparent contradiction over the first answer is due to the critical labor shortage in West Germany which makes greater-than-normal capital expansion necessary.

Q. Will wages in West Germany continue to rise this year? Can productivity keep up with wage costs?

A. Wages are increasing. In some industries these increases can be absorbed by rising productivity, but there are industries without such a possibility. These industries are heading for trouble.

Q. What is the outlook for material costs this year?

A. Because of wage increases and the unchanging high demand, material costs will continue to show a strong tendency toward higher prices. I am referring only to costs of West German materials, of course. West Germany depends upon other nations for raw materials in great volume and I cannot, obviously, anticipate what will happen

NORDHOFF: Give and take.

in each of these raw-material-supplying nations.

Q. In recent years many American manufacturers have set up plants in West Germany. Do you think this trend will continue?

A. I think this is a sensible and realistic move to take, avoiding as it does tariff barriers and other problems. It also has the tremendous advantage of getting the manufacturer into the European Common Market, which is becoming more important each year.

Q. What new conditions should American companies, now planning to manufacture in West Germany, consider before going ahead?

A. The pronounced and critical labor shortage.

Q. What effect might the further lowering of tariff barriers among Common Market countries in 1961 have on West German trade? On U.S. exports to West Germany?

A. We like any further lowering of tariffs not only because West Germany—with the lowest tariffs in all Europe right now—can only gain from them, but also because a free or virtually free exchange of goods all over Europe is, in my opinion, an absolute necessity for Europe's economic survival. Europe's position generally will become stronger as economic unification continues. The further lowering of tariffs will certainly help increase American exports to Europe. First, the trend will no doubt spread to countries outside the Comman Market, like the United States. But also, and more important, the increased purchasing power in Common Market countries will make it possible for consumers to buy and enjoy more U.S. products.

Q. Some say the 5 per cent revaluation of the Deutsch Mark will have little effect on West Germany's trade balance. What is your opinion?

A. The direct and immediate influence was not pronounced. But in the long run, all German exporters will have to be more efficient to hold export markets.

Q. In view of the present demand, might the 5 per cent revaluation cause Volkswagen to lower its prices to U.S. consumers?

A. Unfortunately, the revaluation made necessary a small increase in the retail prices of our cars in the United States. By effecting certain economies, our American importer and network of distributors were able to hold the price increase to only 2.4 pct on the average.

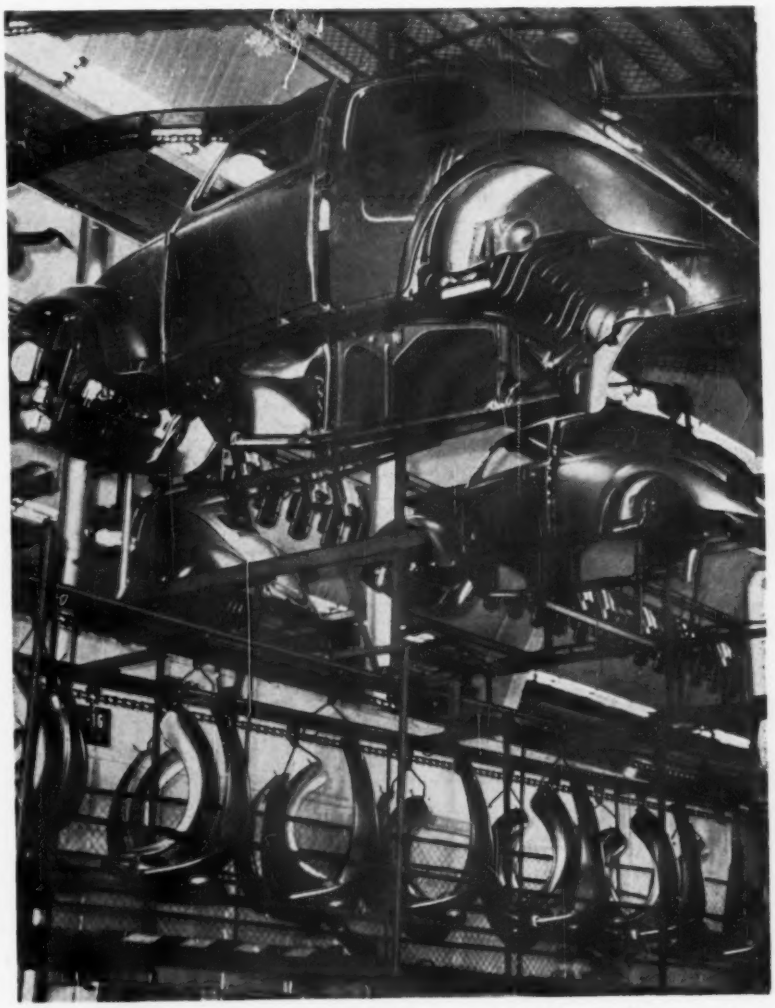
Q. You have said many times that Volkswagen is truly an international company. What do you mean by this?

A. Volkswagen is trading more intensely with other countries all over the world—actually 118 countries—than any other automobile manufacturer anywhere. We sell more and we buy more outside our home country than any other Eu-

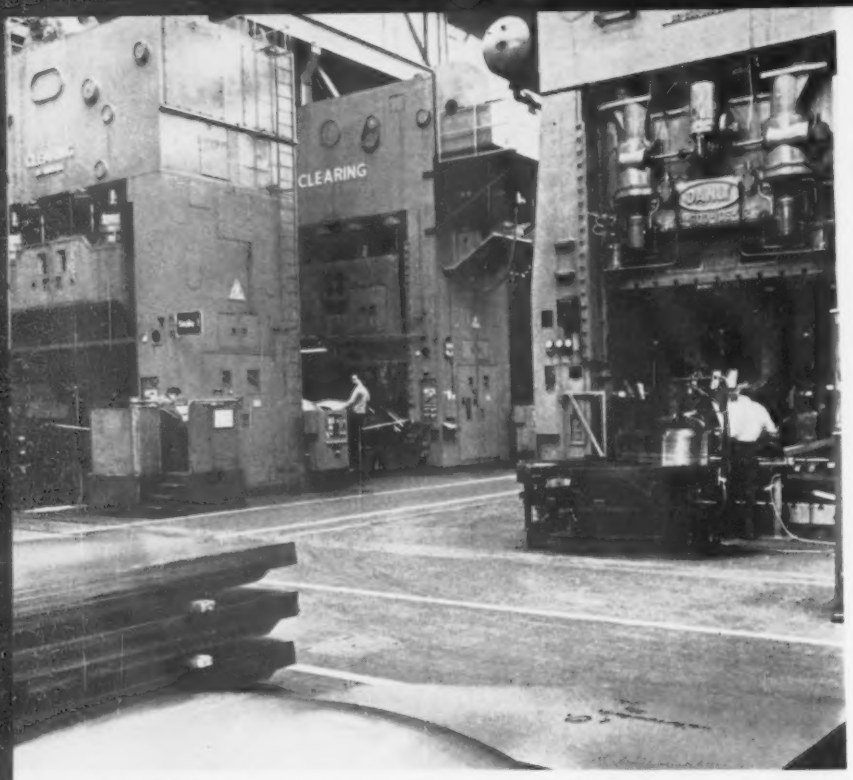
NEXT WEEK

The Big Problems: Housing and Labor

West Germany is harassed by a shortage of workers and houses in which to shelter them. The severity of both, and their impact on the economy, are pointed up in next week's report.



MOVING UP: Conveyors carry bodies to assembly. Volkswagen buys 50,000 tons of steel yearly from the American steel industry.



U.S. TOOLS: American production equipment finds strong acceptance in Volkswagen plants. VW bought $50 million worth in past three years.

ropean automobile company. Exports equal 57 pct of our production. It is apparent that our cars and trucks fill the need of more countries than any other vehicles built anywhere in the world. We are proud of this fact.

Q. How much sheet steel did Volkswagen buy from the U.S. last year? What is it expected to average in 1961?

A. The average was 4000 tons per month or approximately 50,000 tons last year. This figure will be true for 1961 just as well.

Q. How does the present quality of deep-drawing sheet steel, available from producers in Western Europe, compare with that produced in the U.S.? How do prices compare?

A. Quality of deep-drawing steel in this country today is now equal to American steel. There is no real difference in price.

Q. Presently, is there enough capacity in Western Europe to meet Volkswagen's need for deep-drawing quality sheet?

A. There is enough capacity in Western Europe to meet our sheet steel demand, but we still buy—and will continue to buy—from the U.S.

Q. In the past three years VW has spent $50 million dollars in the U.S. for machine tools and presses. How much is planned for 1961?

A. For 1961, we shall keep on buying American machinery in about the same rate as previously.

Q. If order backlogs of West German machine tool and press builders fall off, will this greatly reduce future purchases from the U.S.? If not, why?

A. We will continue to buy from previous suppliers because we prefer certain American machines regardless of the availability of similar machinery in Europe. It is our policy always to buy the best equipment for a specific job regardless of country. We expect to continue that policy.

Q. What types of U.S. production equipment are preferred by VW? Why?

A. We prefer gear cutting machinery, grinding, vertical lathes, presses, sheet-metal roller levellers, and many more from the U.S. These are, we feel, the best available anywhere.

Q. In the face of this year's world decline in auto sales, how do you view the world market for autos in the next two, five years?

A. In spite of the the past recession I believe that the world demand for cars will continue with a slightly increasing trend. But it must be clearly seen that present capacity can easily cover any demand to be expected, so competition will be increasingly stiff.

Q. When might the VW-1500 be offered in the U.S.?

A. As soon as we and our American organization feel that the volume of sales will justify the capital investment required by our dealers to sell and service this new car with the same standards of quality we demand in the regular Volkswagen. This volume of sales depends on the production rate in Wolfsburg and the market conditions in the United States. I can give no precise date.

Q. There are signs of a more protectionist attitude on the part of some American businessmen. How seriously do you view this in terms of U.S.-West German trade and world trade?

A. I regret this attitude, of course, not so much because it makes our sales in the United States more difficult, but because the prosperity and future of the Western World cannot survive without free exchange of goods and values. If any partner of this side of the world is closing his borders, more or less he is triggering a widespread reaction which will be detrimental to everybody including those who think to protect selfish interests. It is always give and take.

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Service Centers Push Marketing

The Aim: Aiding Sales by Aiding Customers

From now on, many steel distributors will step up efforts to solve customer problems.

Market research was stressed at annual Steel Service Center Institute meeting.
By G. F. Sullivan.

▪ The nation's top steel distributors took a hard look at modern marketing last week. As a result, many steel users can expect more specific data on cost cutting.

Carried to its logical end, the steel service center salesman will spend less time making routine calls, put more effort into studying customer problems. The aim: To get more business by showing a steel user how to cut steel inventory, or processing costs. And it works, as many case studies show.

Move on Marketing — Meeting last week in Washington, members of the Steel Service Center Institute devoted a full day to more effective selling. They learned how to help their customers figure the relative advantages of mill versus warehouse steel, how to make better use of service center processing facilities.

Although market research has been used for some time by the larger steel service centers, it now appears that the majority will move into it. As one executive put it, "The profit pinch is killing us; we've got to be more efficient in selling—or else."

It doesn't have to be a big deal. One member figured the cost at about $500 a year, plus some after-hours work by the top sales staff. Nearly 200 executives sat down to learn how to code customer lists, how to figure market share and market potential.

Business Is Better—For the first quarter of 1961, sales of steel service centers were 12 pct ahead of the last quarter of 1960. And currently, they're up another 3 to 5 pct. In giving these figures, the institute's executive vice-president, R. G. Welch, added that he thought the year as a whole might be 5 to 10 pct ahead of 1960.

For the long pull, institute members expect to handle more of the nation's steel than they do now. In stainless, for example, they heard L. R. Larson, International Nickel Co. vice-president, predict total stainless steel shipments in 1967 of 1.1 million tons, or 87 pct above the 1957 figure. And he sees a greater percentage of this moving through service centers.

Computers Coming — Institute president Wayne Rising, Sr., Ducommon Metals & Supply Co., also took a look ahead to the day when service centers will use computers for inventory control.

For the immediate future, steel service center operators look for a modest buildup during the next 90 days. They see a little less pressure from imports. But they don't expect the real impact of better business to show up until fall; service centers usually don't feel the effect of increased mill demand (which has been climbing for 10 weeks) until 8 to 10 months later.

On balance, it looks as though the first quarter pickup in service center business was due largely to low customer inventories, Mr. Welch feels. But during the past 6 weeks he says members believe the pickup has been on sounder ground. (See p. 136 for details on product demand.)

NEW HIGH COMMAND: Officers elected by the Steel Service Center Institute for the 1961-62 terms are, (left to right), President R. J. Heggie of A. M. Castle & Co., Executive Vice President R. G. Welch of the Institute, Chairman of the Executive Committee R. W. Shaw, Jr. of A. R. Purdy Co., Treasurer M. R. Lowenstine, Jr. of Central Steel & Wire Co., and Vice President N. F. Korhumel of Korhumel Steel & Aluminum Co. Another vice president, J. H. Roberts, Jr. of Edgcomb Steel of New England, was absent when photo was taken.

Short-Term Outlook Is Bright

A "Presidents' Panel" Predicts Further Upswing

But warnings are sounded that old problems remain. Profit squeeze will continue.

Strength of the upturn is seen carrying into early 1962.
By J. D. Baxter

■ The short-term business outlook is up. But it is not all rosy. While recent production and sales gains show promise of continuing, prices and profits are still sore pressure points.

This was the consensus of a blue-ribbon "presidents' panel" at the recent Fourth Economic Conference of the National Industrial Conference Board. Four members of the panel were metalworking executives:

T. F. Patton, president, Republic Steel Corp.; S. H. Egbert, president, Studebaker-Packard Corp.; H. C. Turner, Jr., president, Turner Construction Co.; and R. S. Stevenson, president, Allis-Chalmers Mfg. Co.

Steel Gains — Mr. Patton predicted that the current second quarter may be "20 to 30 pct better than the first quarter in steel ingot production." He expects steel output to rise during each quarter of 1961 and the first half of 1962.

Looking ahead to 1962, Mr. Patton forecasts a weekly ingot output "exceeding 2.4 million tons."

But he adds: "Despite our best effort, steel is in a serious profit squeeze." The Republic chief executive cites the acute need for capital from profits to modernize in view of increases in world steel capacity. The U. S. must look to holding its own in world competition.

Auto Outlook—"The auto industry," said Mr. Egbert, "looks for an annual 2.8 pct increment increase in industry sales through 1970." Looking at the shorter term, he predicts passenger car output by U. S. factories of 5.5 million units in 1961. This will be reached on strong year-end sales.

"We can reasonably expect the industry's sales to rise to a 6 million annual sales pace by September, going on to reach a 6.4 to 6.8 million annual rate for the fourth quarter."

Construction — In construction, Mr. Turner stated that current contract awards are not "particularly encouraging." He expects public and residential construction to show "some improvements" as the year develops. But commercial and industrial work he expects will just "hold its own" until late in the year.

Mr. Turner's jarring point was made on prices. "If there is any material increase in construction volume," he said, "construction costs could easily advance from 10 to 15 pct inside of a year or two."

Machinery—Mr. Stevenson looks for farm equipment and construction machinery sales to continue modest advances through the year. And he predicts a 5 pct sales rise for electrical equipment. "General industrial machinery," he said, "will swing with the same strength as the business cycle."

He believes capital equipment buying will "likely be slightly ahead of last year."

But Mr. Stevenson says it will take a sales volume hike of 7 to 8 pct to offset the deficit of the first half.

How Top Brass Views Short-Term Prospects

STEEL

"Steel ingot production in the second quarter may be 20 to 25 pct better than the first. Production in the fourth quarter may be at the rate of about 2.2 million tons weekly, up 50 pct over fourth quarter 1960." T. F. Patton, president, Republic Steel Corp.

AUTOS

"We can reasonably expect industry sales to rise to a 6 million annual sales pace by September, going on to reach a 6.4 to 6.8 million annual rate in the fourth quarter." S. H. Egbert, president, Studebaker-Packard Corp.

CONSTRUCTION

"The current outlook is not encouraging in indicating a sharp upward trend. Public and residential construction should show an improving trend this year. And industrial work should hold its own." H. C. Turner, Jr., president, Turner Construction Co.

MACHINERY

"Farm equipment sales will continue their advances. More highway funds will improve construction machinery sales. Electrical equipment sales will be up 5 pct over 1960. Industrial machinery will swing with the up cycle." R. S. Stevenson, president, Allis-Chalmers Mfg. Co.

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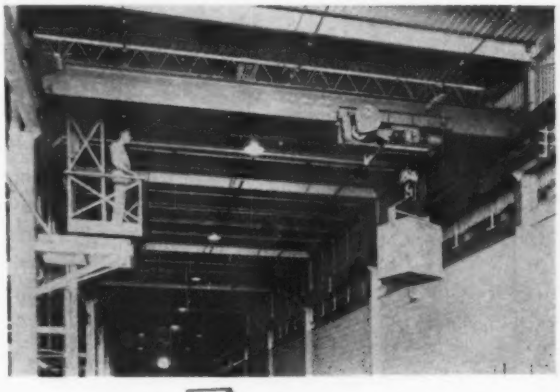

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INDUSTRIAL BRIEFS

Magnet Choice—W. G. Scharnberger, Crucible Steel Co., was elected president of the Permanent Magnet Producers Assn. W. E. Gilman, General Magnetics Corp., Chicago, was named vice president. H. R. Bulmore, Simonds Saw & Steel Co., Lockport, N. Y., was elected treasurer.

Name Change — General Steel Castings Corp. has changed its name to General Steel Industries, Inc., of Granite City, Ill.

Drill Starts—United States Drill Head Co. has moved into new plant and offices in Cincinnati, completing a $750,000 expansion program.

Havana Home—Wheeling Corrugating Co. is building a culvert fabricating and bituminous dipping plant in Havana, Ill. It will cost $500,000.

Baltimore Bound — Whitehead Metals, Inc., has opened a new sales office and warehouse in Baltimore. Inventories of corrosion-resistant metals will be increased.

West Coast Outlet — Flexible Coupling Div., Sier-Bath Gear & Pump Co., Inc., has opened a new warehouse in San Francisco to serve 11 western states.

Westward Hoist—Columbus McKinnon Corp., Tonawanda, N. Y., has opened a manufacturing, sales and service branch in San Francisco It will offer hand and electric hoists, welded link chains and attachments.

Atlas Assist—Minneapolis-Honeywell Regulator Co.'s Special Systems Div., Pottstown, Pa., has received a $7 million Convair contract to produce ground support equipment for the Atlas missile "F" series.

A-Sub Work — Westinghouse Electric Corp. has received a Navy contract to procure nuclear reactor components for fleet ballistic missile submarines. The components will be purchased from qualified industrial sub-contractors.

Navy Gears—Philadelphia Gear Corp., King of Prussia, Pa., has received a $2.5 million contract from General Dynamics Corp.'s Electric Boat Div. to develop gear drives for the 600-ft radio telescope being built for the Navy at Sugar Grove, W. Va.

NASA Award — Aetron Div., Aerojet-General Corp., Covina, Calif., has received a $4.8 million NASA contract for additional work on the Saturn static test facility at Huntsville, Ala. It includes final design as well as procurement and fabrication of technical systems and instrumentation.

Space Glider—Goodyear Tire & Rubber Co. will design and develop the main landing gear skids for Dyna-Soar, the Air Force manned space glider. Work will be done at Goodyear's Aviation Products Div. at Akron, O.

Nuclear Blend—Michigan Chemical Corp.'s Rare Earths and Thorium Div. has completed a contract with Atomics International Div., North American Aviation, Inc., to supply high-density gadolinium-samarium oxide blend. It will be used in the control rods of the Hallam Nuclear Power Facility, Hallam, Neb.

On the Line—Mesta Machine Co., Pittsburgh, will build a 60-in. continuous galvanizing and aluminum coating line for steel strip at the Gary Sheet & Tin Mill of U. S. Steel Corp.

Uranium Deal — The Atomic Energy Commission has signed a $100 million, five-year contract with Union Carbide Corp., through Union Carbide Nuclear Co., to purchase uranium concentrates produced at the Rifle and Uravan, Colo., processing mills.

Five-Year Pact—Western Gold & Uranium, Inc., has signed a contract under which all uranium ore produced from its Orphan mine at Grand Canyon, Ariz., to the end of 1966, will be sold to Rare Metals Corp. for processing at the Tuba City Ariz., mill.

Company Launched—Ellis Fluid Dynamics Corp. has opened a plant and offices at Skokie, Ill. The newly organized company will specialize in vibration and shock control equipment.

Modern Plant—Porter-Mathews Co., Inc., sheet metal products manufacturer, has opened modern plant and offices on Route No. 1, Princeton, N. J.

Better Communications—Philco Corp. has opened a $1 million building in the Fort Washington, Pa., Industrial Park. It will house Philco's expanding Communications System Div.

Texas Switch — Commercial Metals Co. of East Texas has moved from Gladewater, Tex., to Longview, Tex.

Conklin Change—T. E. Conklin Brass & Copper Co., Inc., has moved to larger quarters at 113 Leonard St., New York.

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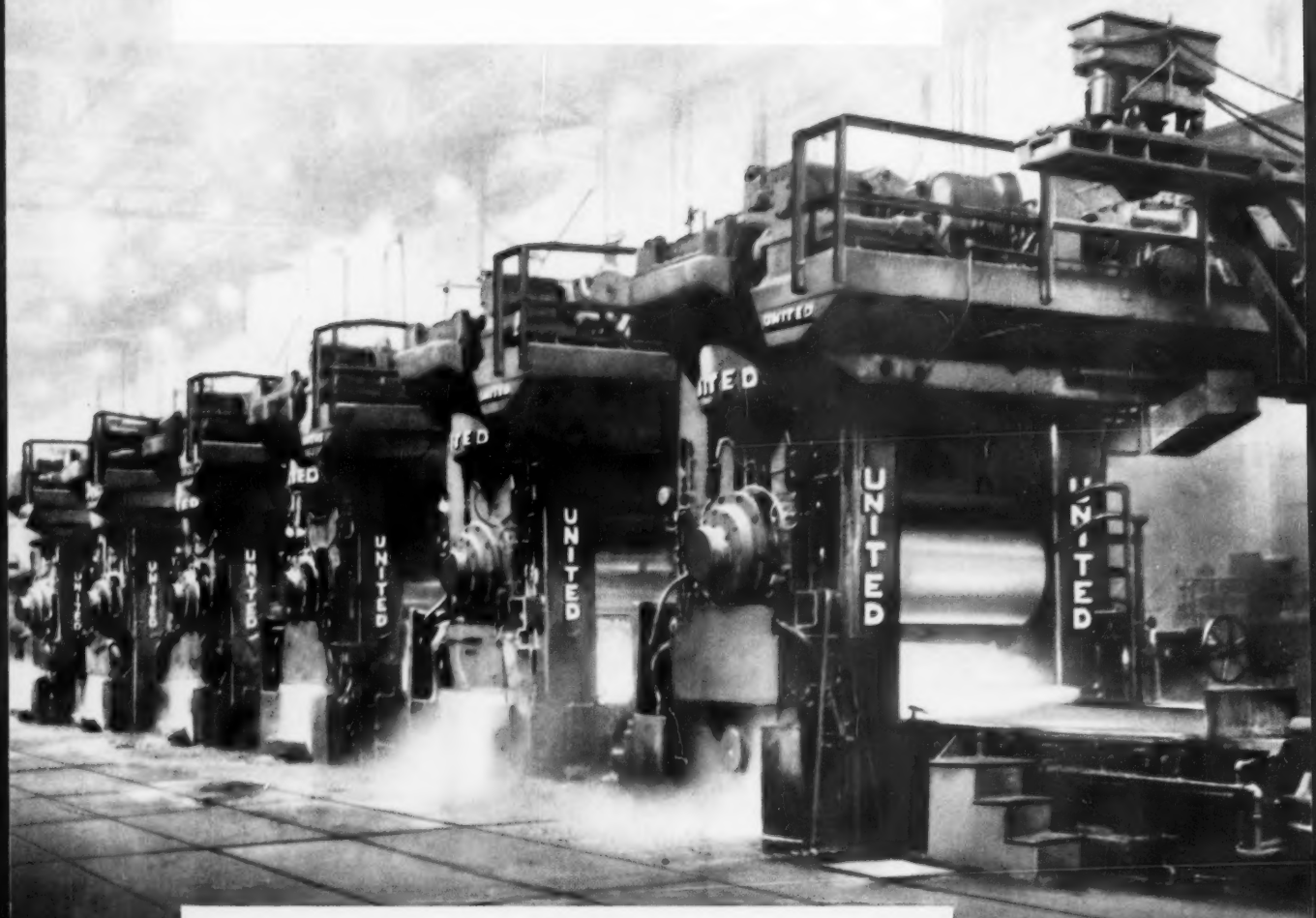

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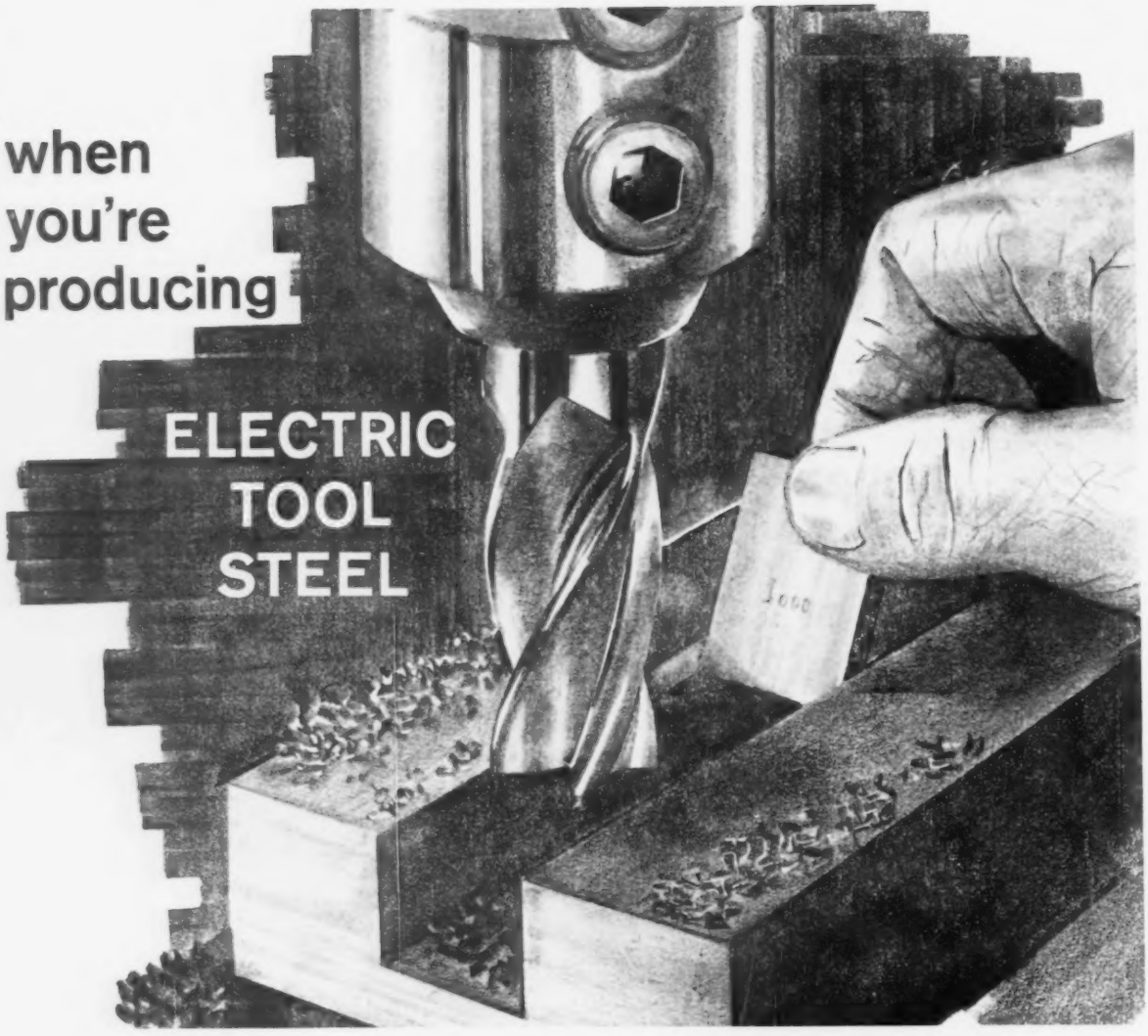

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■ Today's manager spends more and more time solving problems created by technological development.

This emphasis on the technical will keep on increasing. Tomorrow's manager will almost certainly move even deeper into technical waters.

Why It Happens—Many strong economic forces are pushing industry in that direction. Some of them: Demands for more sophisticated consumer products and more complex military weapons; automation and other production improvements; and more competition in international trade.

One management analyst has taken a searching look at some of these trends and what they will mean to business managers. He is Estill I. Green, an engineering management consultant and former executive vice-president of Bell Telephone Laboratories, Inc.

How It Happens—Writing in the University of Indiana's Business Horizons, he sums up the situation this way: Technical advance is still building up in most fields. It's becoming more complex, with the accepted boundaries between fields disappearing.

The cost of technological advance is rising sharply. Often increases in R&D spending lead to capital spending for producing plants. A growing share of R&D effort is conducted by the government, especially in the areas of national defense.

In fact, Richard S. Morse, assistant secretary of the Army, points out the U. S. pays, directly or indirectly, for more than 50 pct of all basic research.

Questions to Answer — This trend, and others mentioned earlier, pose "new and grave problems for industrial management," Mr. Green notes.

He believes these are some of the questions raised:

On Organization: What sort of a structure is best adapted to technological change? How large an R&D program should be undertaken? How will it be planned, evaluated, and financed?

On Personnel: How can the professional staff best be managed? What's the best way to motivate and challenge them? (For more on this see IA—May 4, '61, p. 65.)

On Direction: What qualifications and training will the managers need? How much understanding of science? When is technical training necessary for managers?

On Cooperation: How can business and the government cooperate more effectively? Can industry make better use of government advances in technology?

Financing a Small Business

■ Small companies don't usually hesitate to ask for—and get—short-term loans.

But when it comes to long-term loans and capital financing the situation is different. A survey made by the Federal Reserve System bears this out.

Short - Term Success — Among those questioned, about 70 pct of the companies needing short-term credit got what they wanted. However, only 34 pct of those seeking long-term loans reported their needs had been met satisfactorily. And in the hunt for equity capital, only 10 pct reported success.

Many companies needing long-term capital don't even bother trying to find it. About three-fourths of the companies with unfilled long-term credit needs had made no effort to borrow.

Reasons for Failure—Why are the small companies less successful (or less interested) in long-range financing?

There are several reasons. Some owners are reluctant to share ownership and control with outsiders, which equity financing requires. Also, new or small companies find it difficult putting up the necessary security. Uncertainty about future earnings also makes them poor credit risks.

This tough corrosion problem licked by M&T spray-on plastisol coating

Over 6000 LPG tanks in a severe location were at stake in this case. The tanks are installed outside for domestic gas service, are coated for appearance as well as protection. But coatings suffer constant high humidity, windy salt atmospheres, sweating of tank surface and expansion and contraction due to refrigeration effect as the liquid contents turn into gas.

In the worst locations, tanks would have to be replaced after a year. Even in moderate locations, severe corrosion would take place prematurely. Requirements called for coating to protect with minimum maintenance for five years.

Exhaustive testing showed that Unichrome Super 5300 Coating — an M&T sprayable vinyl plastisol — had the answer. Having the best combination of properties, it could survive and block corrosion in locations where rust chewed into metal within months. It is a good thermal insulator and controls sweating. It has the toughness to resist physical damage hazards, the resiliency required by temperature change, the stability in sunlight.

Unichrome Plastisols apply by all usual production methods, not only in the heavy duty industrial-type protective applications but also for product finishing. You can also get M&T spray-on vinyl finishes for use on patterned metal, or for texture on smooth metal.

M&T has multi-plant facilities to deliver consistent quality, in quantity, on schedule. Avail yourself of this kind of service and coating performance. Send for bulletin, or an M&T Coating Specialist.

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In Canada: M & T Products of Canada Ltd., Rexdale, Ontario

'62 Cars Get Beauty Treatment

Improved Interiors, Fin-Less Exteriors Form New Look

Better looking interiors and revamped exteriors are in prospect for 1962 model cars.

Fins are going. More materials, colors and optional trim packages appear to be coming. By A. E. Fleming

■ Interiors of 1962 model cars are being revamped. There is more emphasis on improving looks, from dashboard to rear seat.

In some cases, this means extra optional trim packages—more materials, more colors. This seems particularly true of General Motors Corp. and Ford Motor Co. models.

Fins Finished—Chrysler Corp. is making the most noticeable change in exterior design. There is a definite foreign touch to 1962 Chrysler model styling. This means no fins.

Other Chrysler makes will be definned also as the foreign theme creeps subtly into body design. The 1962 Plymouth will adopt some Valiant styling characteristics.

Short Wheelbase—Both the 1962 Plymouth and Dart are being shortened in wheelbase, to 116 in. from 118 in. on 1961 models. It appears the 122-in. wheelbase Polara series will not be around next season.

Dodge will concentrate on Darts and Lancers. The Polara has not been pulling too many sales this year.

However, there will be an Imperial model, distinct from the Chrysler line in 1962.

Plans have changed several times on this. A few months ago, the idea was to incorporate the Imperial into the Chrysler line as a series. But apparently this plan has been tucked away, at least for the time being.

Big Three Eye Gains By Rambler Softtop

Rambler is enthusiastic about its 100-in. wheelbase American convertible. Production began slowly around the first of the year (140 built in December, 400 in January).

Output is gaining. The little softtop now accounts for 20-to-25 pct of American volume. Plenty of orders are on hand. And there is a long waiting list at Rambler dealers.

7400 Built—As of May 11, some 7400 convertibles were turned out. They are being assembled at the rate of 150-a-day, out of a total of 700 American models daily.

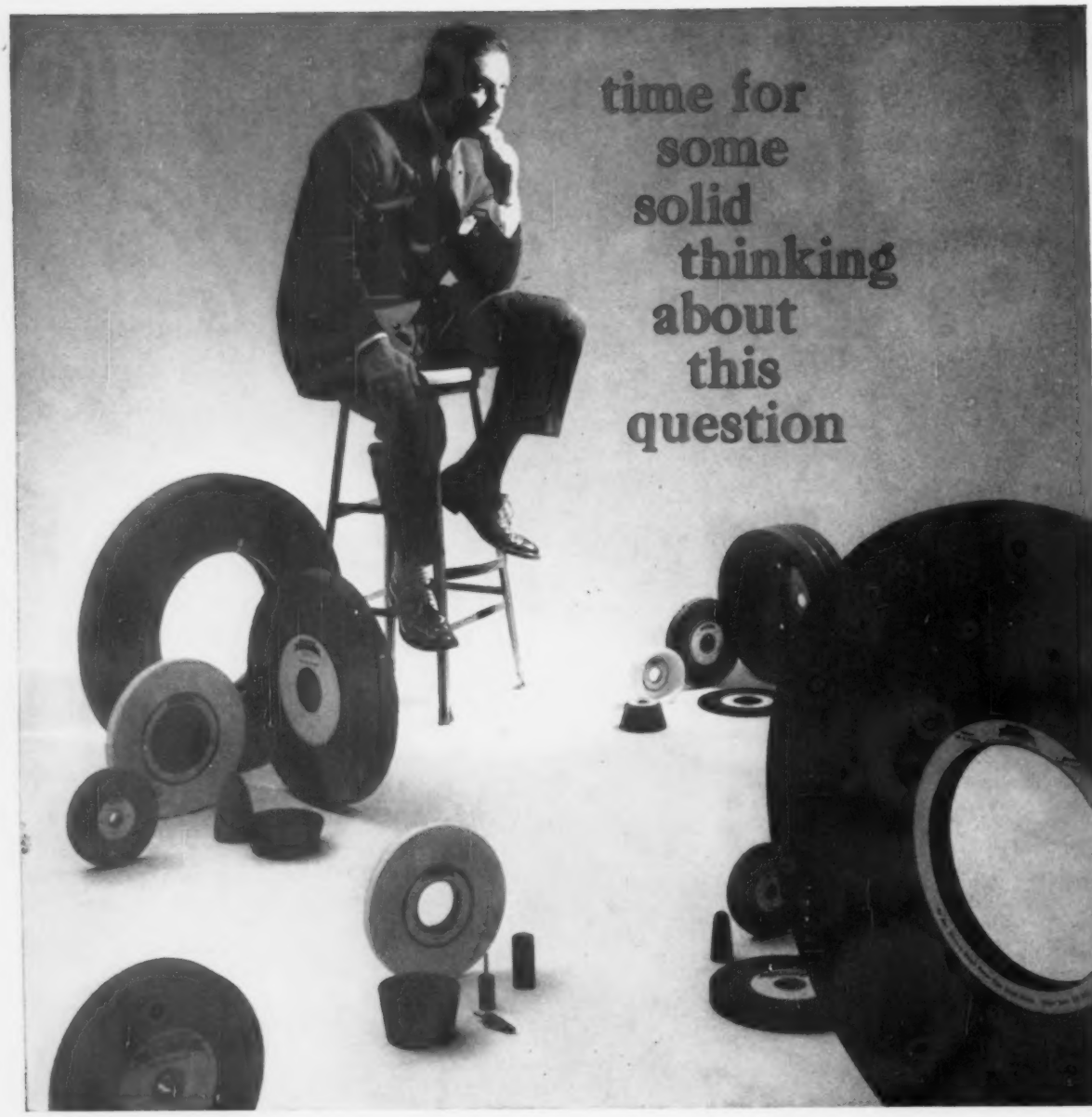
Other compact car makers are keeping a watch on Rambler sales.

At least one, possibly three, General Motors divisions will come up with a 1962 compact convertible. Best bet is Oldsmobile's F-85. A convertible in the Corvair line would put added spark into the Monza market.

Market Is There—As E. D. Rollert, general manager of GM's Buick Div., told The IRON AGE when the Skylark was introduced, "There's certainly a market for a compact convertible. It would fall in line with the Skylark concept of providing the customer with a really luxurious compact car."

Ford Scientific Lab Hunts New Metals

NEW APPROACH: Research leading to new, extreme strength metals is a major activity at Ford Motor Co.'s Scientific Laboratory in Dearborn, Mich. Here, technicians pour an experimental alloy.



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Computers: Supersonic Market

Computer information - processing is now a $3 billion-per-year industry.

Experts figure it will double in value by 1965. Thomas J. Watson, Jr., says 4500 are now in use and more are on order.
By R. R. Kay

■ The computer information-processing industry will be as big, one day, as today's automotive industry.

That's the prediction of Thomas J. Watson, Jr., who last week was named chairman of the board, International Business Machines Corp. The spot into which Mr. Watson moves was newly created. He remains chief executive officer, a position he has held since 1956.

Succeeding Mr. Watson as president of IBM is Albert L. Williams, who became executive vice president in 1954.

Great Growth—Mr. Watson told The IRON AGE that the computer industry is pushing ahead at supersonic speed. Some 4500 electronic digital computers already are solving business and scientific problems. Another 4500 have been ordered from computer makers.

The industry now rings up $3 billion per year in sales and services. Some experts predict this will double by 1965.

Many Uses—The market for computers is enormous. Mr. Watson cites a wide range of uses, ranging from language translation to process control.

Information storage and retrieval is a major market.

"Without some machine aid here," says the IBM chairman, "the job of bringing all needed information to bear on complex problems is insurmountable."

Biggest Gathering — Southern California is one of the biggest markets for computers — more per square mile than anywhere else in the U. S.

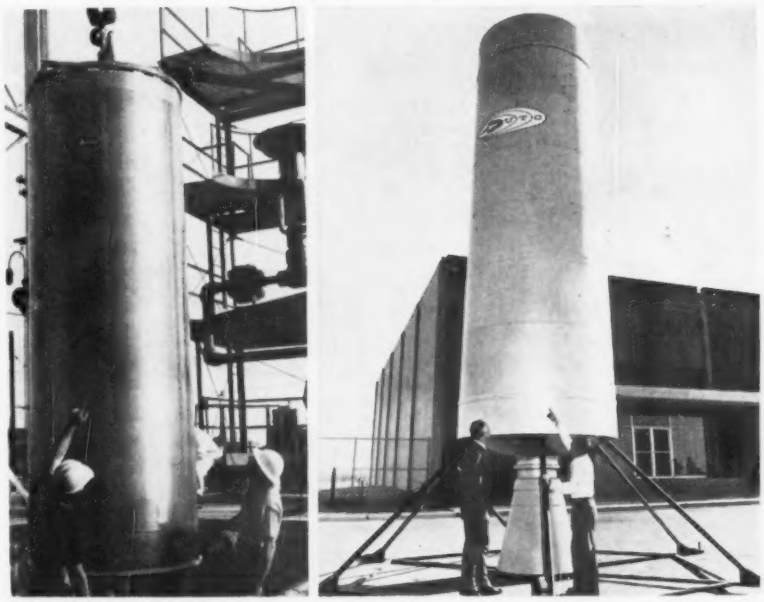
Mr. Watson recently spoke before the Western Joint Computer Conference at Los Angeles. Some 3500 engineers, scientists and mathematicians attended. It was the largest computer conference ever held.

At these sessions, the scope of information compression was pointed out by Richard P. Feynmann, professor, California Institute of Technology. He figures that if we learn to use atoms as "bit codes," we could store, in a cube 0.02-in. on a side, 24 million books. This would be the contents of the world's three greatest libraries.

Heavy Research — IBM last month opened the world's largest research center for the study of computer science at Yorktown, N. Y. Some 1500 scientists and other personnel will work on fundamental research in the building. This will include programs in the physical sciences, mathematics, advanced engineering and the life sciences.

Many ideas formulated in the new center will flow into IBM development laboratories for possible use in data and information processing systems. The three-level, crescent-shaped structure with curving glass front stretches more than 1000 ft along the slope of a hill near Taconic State Parkway. Large areas of floor-to-ceiling glass, and exterior and interior walls of native field stone, are dominant architectural features of the building.

Solid Fuel Space Systems Face Tests



ROCKETS AWAY: There are 1.5 million miles of glass threads in this rocket motor chamber (left) for the 2500-mile range advanced Polaris missile due in 1964. The 14 ft long, 4.5 ft diam chamber was built by Aerojet-General Corp. The 250,000 lb thrust conical, segmented, solid-propellant rocket motor (right) will be test fired this summer by its builder, United Technology Corp. The rocket rises 36.5 ft in the air.

500 Ton Capacity Car Type Furnace

This Amsler Morton 500 Ton Combination Heat Treating and Forge Furnace is the largest of its type ever built.

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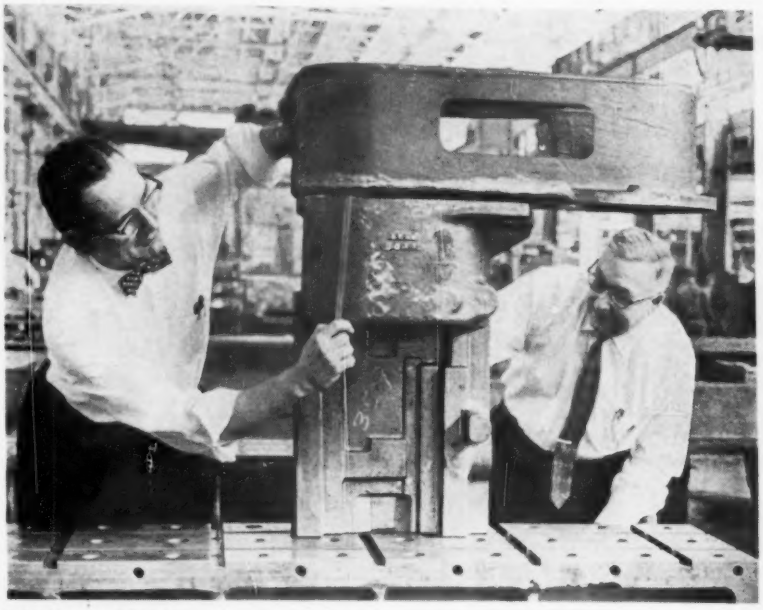
Builders Forge Own Recovery

Some tool builders aren't waiting for help but are forging their own recovery.

Advanced planning with market studies is telling them what types of design will be needed in the future by users.
By R. H. Eshelman



NEW MACHINE: Rough casting for G. A. Gray Co.'s new Handymill miller is checked by Art Rice (left), vice president, and Earl Kendle.

■ Without waiting for government tax reform, business recovery or a surge of capital equipment programs, some machine tool companies are forging their own recovery.

One of the most promising approaches seems to be through advanced planning — using market studies to find what types of design can best fulfill the future needs of machine users.

Compact Planer—Success of this kind of effort is found at G. A. Gray Co. Working through a forward planning committee, the builder of "jumbo" cutting machines developed an economy-model, compact planer.

It was introduced at the Chicago Machine Tool Exposition under the name "Flying Scot."

World Trade—The long range planning, research and engineering development program is paying off. Just back from an extensive tour of Japan, company president Graham E. Marx reports that over a dozen units have been sent to or are on order from the Far East.

Says Mr. Marx, "A machine tool manufacturer today must be 'all-eyed'—he must devote attention to powerful and sophisticated machines required by some, but at the same time devote equal energy to the demand for productive, simple, accurate, inexpensive machines."

New Miller—In announcing development of a new, openside miller (Handymill) using the same concept, Mr. Marx notes that the budget-priced, compact tools appeal not only to smaller companies, but also to the giants of industry. They require such machines for tool room, maintenance, machine rebuilding and repair work, he explains.

More creatively conceived and cost engineered machines can open new fields for American builders, Gray executives believe. According to Charles W. Doepke, vice president, sales, "It is impractical for us to try to compete on purely a cost basis alone, especially when we face less expensive foreign tools."

Move Ahead—"We must compete through innovation," he says. "If we can offer something exclusive, create something new for every continuing new area of use, then we can move ahead."

In maintaining a technological lead in world competition, Mr. Doepke believes full attention also must be given to potentialities of numerical control. Gray Co. entered this contest for more sophisticated, automatic control last fall. Shown then was a unique system of tape control that can be used on Elephant planer-type milling and boring machines for position readout only; operator push-button programing with readout; and complete tape programing in advance with readout at the machine.

Special Course—Now the company is planning a special training course. It will be aimed at servicing and preventive maintenance of the control equipment, often a major problem with new installations.

The course will be five-day sessions. It will cover design and operating features of the system, and also give participants a working knowledge of decimal and binary codes, and numerical control.

Call Crucible for specialty steel in stock

Ask the Crucible inside salesman for any type, form, size and quantity of special purpose steel. He'll confirm immediate delivery from stocks on his own center's floor.

His center is literally a "one-stop" source for thousands of steel items, in quantities from less than a pound to over a ton. Suppose you need a dozen different types of tool steel, for example. He can fill *all* the requisitions – for air-, water-, oil-hardening types; hot work tool steels; high speed steels; or others. Or suppose you need stainless. His in-stock records show more than 20 types in all forms, finishes, sizes. The same holds true for alloys, free machining steels, drill rod.

He can also process your requisition through other Crucible steel centers or mills. He's linked by teletype with an electronic computer for inventory control at Crucible headquarters. So, he can make arrangements for immediate delivery while you're on the phone. It's the fastest and most extensive communications system in the business.

For information, call the local Crucible steel center or write: *Crucible Steel Company of America, Four Gateway Center, P. O. Box 88, Pittsburgh 30, Pa.*

CALL CRUCIBLE
– and ask to have your name added to the mailing list to receive local stock lists.

CRUCIBLE STEEL COMPANY OF AMERICA

W. F. Foss, elected senior vice president, finance and international operations, Motec Industries, Inc.

Youngstown Sheet and Tube Co. —**R. H. Frazier,** named manager, applied research; **J. W. Lodge,** appointed acting supervisor, new product development; **Dr. M. C. Chang,** named supervisor, raw materials research; **Dr. R. P. Morgan,** named supervisor, physical metallurgy; **Dr. J. M. Uys,** appointed supervisor, iron and steel making; **G. H. Denton,** named asst. supervisor, raw material research; **J. L. Bayer,** named research engineer, mineral petrography; **W. R. Patterson,** named research engineer, product research; **H. J. Oberson,** named research engineer.

Carpenter Steel Co. — **A. A. Mendes,** appointed branch manager, North Jersey district.

United States Steel Corp.—**W. L. Longnecker,** appointed director, engineering and research; **W. O. Everling,** named research consultant; **R. E. Griffiths,** named director, product development; **Dr. R. B. Hoxeng,** appointed director, research, American Steel and Wire Div.; **E. J. Brandon,** appointed division superintendent, steel production; **W. R. Maier,** appointed superintendent, steel production; **C. W. Haas,** appointed Eastern representative, merchant pig iron sales.

Armco Steel Corp. — **R. H. Etnyre,** appointed works manager, Houston plant, National Supply Div.; **J. O. Miller,** named works manager, National Supply's Gainesville, Tex., plant; **R. A. Priest,** named chief industrial engineer, Gainesville.

National Steel Corp.—**E. D. Lewis,** named asst. manager, sales; **J. S. Schreiner,** named manager, order dept., Enamelstrip Div.

Colorado Fuel & Iron Corp.—**C. C. Crawford,** appointed works manager.

Interlake Iron Corp.—**J. L. Johnson,** named vice president; **J. B. Hazle,** named vice president; **L. W. Stolte,** elected treasurer.

M. E. Munroe, Jr., elected corporate vice president, Motec Industries, Inc.

Palmyra Basic Foundry, Inc.—**E. C. Heinzelman,** elected chairman of the board.

Continental Can Co. of Canada —**J. A. Stewart,** elected president.

Harbison - Walker Refractories Co.—**Thomas Welfer,** elected secretary.

Stone & Webster Engineering Corp.—**C. G. Davis,** named vice president; **T. A. Fearnside,** named vice president; **F. R. Stevens,** named vice president.

(Continued on P. 96)

F. M. Cashin, elected president, Refractories Div., Kaiser Aluminum & Chemical Corp.

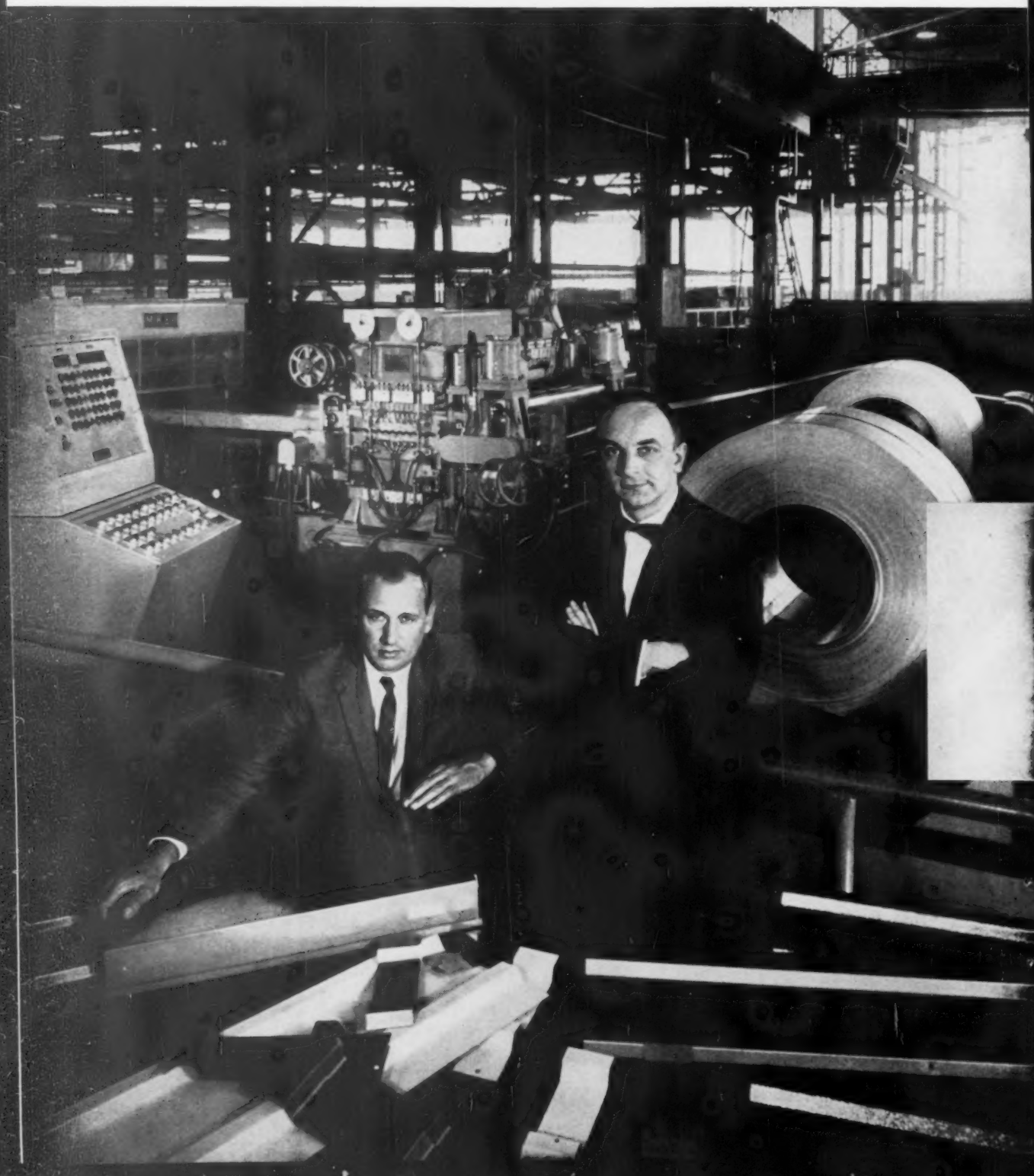
R. A. Clayton, elected president, International Div., Kaiser Aluminum & Chemical Corp.

A. N. Warburton, Jr., elected vice president and controller, Kaiser Aluminum & Chemical Corp.

This is McKay

McKAY DIE SHEAR LINES CUT MORE THAN STEEL. The most economical and efficient shear lines in operation today, they are being used by dozens of leading metal producers, fabricators and warehouses to slash shearing costs. Here, McKay Sales Manager Joseph F. Lyden, Jr., and M. G. Slaney, Building Division Manager, The Parkersburg (W. Va.) Rig and Reel Company — one of the nation's fastest growing manufacturers of pre-engineered metal buildings — examine panel sections cut to length by the high speed McKay Die Shear Line in the background.

Photo by Arnold Newman



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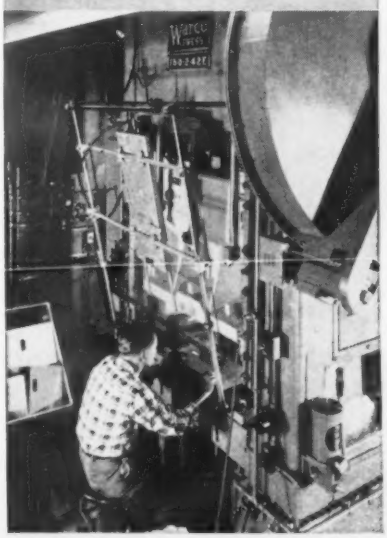
a recognized leader in the development and manufacture of high production metal processing equipment!

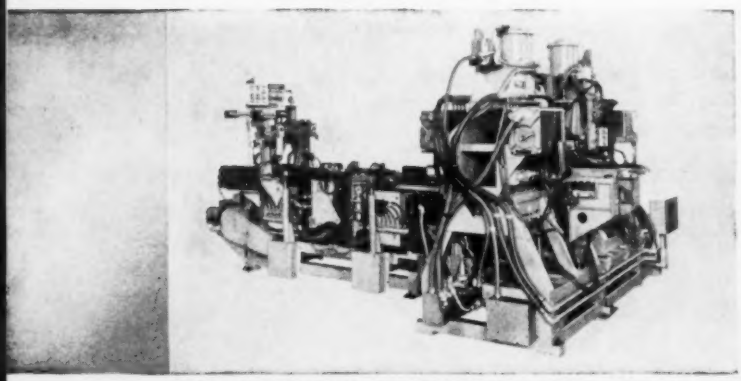
If you fabricate metals and are caught in the "profit squeeze" you'll want to know more about McKay Machine.

It was McKay Machine that pioneered automated integrated production lines, and it is McKay Machine that is today a leader in this field. We have conceived and produced complete lines for the manufacture of building panels, aircraft and missile sections, appliances, cabinets and components, automotive bodies and parts, and farm equipment—lines that are completely automated from *raw material to finished part or product.*

Whatever you make, if it requires metal handling, feeding, slitting, shearing, stamping, welding or forming, it's just good business to acquaint yourself with *McKay Packaged Production Lines*—high speed production equipment engineered to work in unison—with one-source responsibility from start to finish. Write for literature to *The McKay Machine Company, Youngstown 1, Ohio.*

WARCO MECHANICAL PRESSES—advanced in design, noted for their craftsmanship — are used throughout industry. Typical is the high speed, low maintenance 150-ton straight side crank press pictured here in operation at Eastman Kodak.

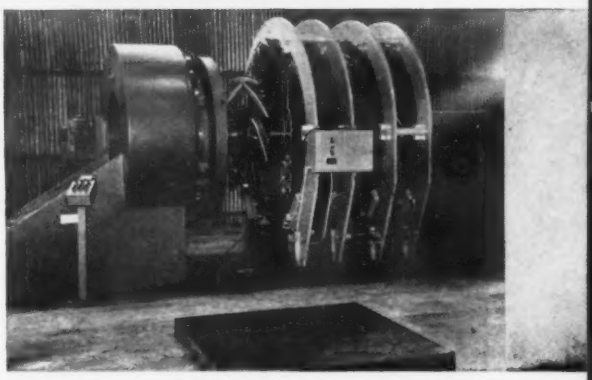




FEDERAL RESISTANCE WELDERS AND WELDING LINES, like this multi-gun combination spot and projection welder used by Hotpoint on their range production line, can be found in the plants of leading metalworking firms the nation over. Individual units, or complete resistance welding lines, are engineered to specifications by McKay's Federal-Warco Division.

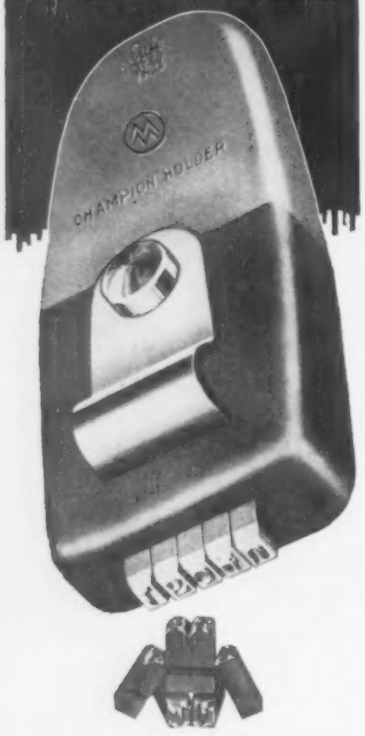
LOOK TO

McKAY MCK MACHINE



BERKELEY-DAVIS AUTOMATIC ARC WELDING MACHINERY produced by Berkeley-Davis, Inc., a subsidiary, is highly popular in the aircraft, rocket, automotive and appliance industries. The rocket body welder pictured here is working at Aerojet General, subsidiary of General Tire and Rubber Company.

MARK IT
CLEARLY...
CHANGE TYPE
FASTER...
with
MATTHEWS
CHAMPION
STEEL TYPE HOLDER



Sturdily built, perfectly balanced, the Matthews Champion Steel Type Holder insures perfectly aligned, clear cut marking. Type changes are fast and easy, with the patented Matthews spring clip assembly. Type faces are precision-engraved on highest quality alloy tool steels.

Write for Bulletin 146-A29

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(Continued from P. 93)

Kaiser Aluminum & Chemical Corp.—**L. A. Amos** and **A. L. Brooks,** named vice presidents; **William Hobbs,** elected treasurer.

Reynolds Metals Co. — **T. R. Armstrong,** named director, distribution, architectural and building products.

Aluminum Co. of America—**P. I. Nielsen,** appointed development manager, machinery and equipment; **C. L. Burton,** appointed development manager, aero-space and military equipment; **D. B. Wood,** appointed manager, bearings development.

Air Reduction Sales Co.—**W. B. Moen,** appointed manager, Cryogenic Engineering Dept., Plainfield, N. J.; **W. J. Kocher, Jr.,** appointed asst. manager, engineering services, Minneapolis District.

Prab Conveyors, Inc.—**J. J. Wallace,** elected president and general manager.

Bunting Brass & Bronze Co.—**R. F. Treuer,** named general manager, western operations.

New Jersey Zinc Co.—**R. J. Kiechlin,** elected comptroller.

Allis - Chalmers Manufacturing Co.—**George Saar,** appointed manager, data processing and systems; **H. C. Nickel,** appointed manager, Nuclear Power Dept., Washington; **H. T. Larmore,** appointed asst. general manager, Construction Machinery Div.

General Motors Corp. — **W. F. King,** appointed head, Electro-Mechanics Dept.; **D. E. Hart,** appointed head, Data Processing Dept.

Ford Motor Co.—**J. B. Dunkel, Jr.,** appointed industrial relations manager; **J. J. Nevin,** appointed controller, Motocraft Div.

Chrysler Corp.—**W. P. Balthrop,** appointed president, Airtemp Div.

American Zinc Co. of Illinois—**T. I. Moore,** elected vice president, manager, Monsanto Electrolytic Div.

T. J. Payne, elected vice president and treasurer, J. Bishop & Co. Platinum Works.

Fidelity Chemical Products Corp. —**Maurice Bick,** elected president.

Burroughs Corp.—**D. E. Young,** elected asst. vice president, general.

Roadway Express, Inc.—**G. J. Roush,** elected chairman of the board; **R. W. Corns,** elected president; **J. R. Wilson,** named executive vice president; **J. C. Crawford,** elected asst. controller.

American Machine & Foundry Co.—**C. R. Stone,** appointed director, production.

Perfect Circle Corp.—**D. D. Minshall,** named vice president, marketing.

Hubbard & Co.—**George Pope,** elected vice president, manufacturing.

F. W. Beitner, appointed vice president, sales, Trent Tube Co.

Charles Yaker, appointed vice president, manufacturing, Whitehall and Muskegon, Mich. plants, Misco Precision Casting Co.

Judson L. Thomson Mfg. Co.—**Irving Hertzberg,** appointed senior vice president and member of the board.

Osborn Manufacturing Co.—**E. K. Hatch,** named manager, Machinery Div.; **E. J. Texler,** named sales manager, Machinery Div.

Spaulding Fibre Co., Inc. — **K. B. Smith,** appointed manager, Fabrication Dept., Tonawanda, N. Y.; **W. O. Graham, Jr.,** named branch manager, Dallas.

Hunter Spring Co.—**C. J. McClintock,** appointed manager, quality control and inspection; **B. S. Seward,** appointed manager, quality assurance.

Indiana General Corp.—**Robert Just,** named chief industrial engineer, Indiana Steel Products Div.

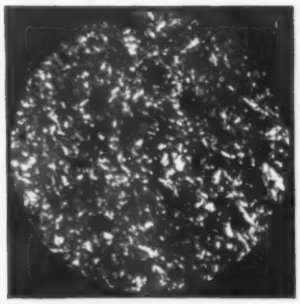
Bendix Corp.—**H. W. Vogtmann,** named senior test engineer, systems and components, Bendix Mishawaka Div.

Tinius Olsen Testing Machine Co.—**R. S. Strimel,** appointed asst. to the president.

Tech-Ohm Electronics, Inc.—**D. E. Chaifetz,** elected president and chief executive officer.

Timken Roller Bearing Co.—**N. H. Peterson,** appointed asst. to the president.

Wheelabrator steel shot® cleans faster because it's harder



Microstructure of Wheelabrator Steel Shot. Magnification is 500 diameters. 2% Nital etch.

A demonstration of WHEELABRATOR'S

VITAL VALUES

The harder the abrasive, the faster it cleans. And Wheelabrator Steel Shot is hard—6 to 10 Rockwell points harder than any other steel abrasive. In addition, it is heat treated to give maximum toughness and longest fatigue life consistent with its uniform high hardness. Thus, you receive the Vital Value of extra savings through reduced abrasive consumption, plus faster cleaning speed because of the higher hardness. Wheelabrator experience in pioneering airless blast cleaning progress always has meant greater savings for you. For the full story of the Vital Values and savings built into Wheelabrator steel abrasives, write for Bulletin 903-D.

VITAL VALUES FOR INDUSTRY

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This mark tells you a product is made of modern, dependable Steel.

Now Available...

USS QUENCHED AND TEMPERED STRUCTURAL SHAPES

in such grades as "T-1", "T-1" type A, 9% Nickel and HY-80 Constructional Alloy and Armor Steels

Announcing another industry "first" for United States Steel—USS Quenched and Tempered Alloy and Armor Steel Structural Shapes are now commercially available for the first time anywhere, in the types and sizes shown in the accompanying tables. The more commonly used sizes of American Standard Beams, Channels, Equal Angles and Unequal Angles will be produced in these USS Steels: "T-1", "T-1" type A, 9% Nickel, HY-80 and certain other alloy grades that provide desirable mechanical properties after quenching and tempering. Later, other sizes and shapes will be added according to demand.

These quenched and tempered alloy and armor steel structural shapes (see table below) can simplify design and result in substantial weight savings, increased structural strength and reduced shipping and handling costs. For a free folder about any of these steels or their structural shapes, contact your local USS representative or write to United States Steel, Room 6310, 525 William Penn Place, Pittsburgh 30, Pa. USS and "T-1" are registered trademarks

United States Steel Corporation • Columbia-Geneva Steel Division • Tennessee Coal & Iron Division • United States Steel Supply Division • United States Steel Export Company

Availability Quenched and Tempered standard structural shapes are available in the following shapes and sizes:

I	Beams: 6" to 12" inclusive	American Standard Sections and Foot Weights*
[	Channels: 6" to 15" inclusive	American Standard Sections and Foot Weights*
L	Equal Angles: 3" to 8" inclusive	Standard Sections*
L	Unequal Angles: 3½" x 3" to 8" x 6" inclusive Maximum Length 40' for all sections	Standard Sections*

*See our booklet, "USS Shapes & Plates," ADUCO-27001

Mechanical Properties of Quenched and Tempered Alloy and Armor Steel Structural Shapes

	Yield Strength, psi	Tensile Strength, psi	Elong. in 2", % min.	Reduction of Area, % min.	Longitudinal Charpy Impact (when specified)	
					Keyhole	V-notch
"T-1" Steel 2½" and Under	100,000 (min.)	115,000/140,000	18	55①	15 ft.-lbs. @ −50F	30 ft.-lbs. @ +10F
"T-1" type A 1" and Under	100,000 (min.)	115,000/140,000	18②	45④	15 ft.-lbs. @ −50F	—
Grade A 9% Nickel	60,000 min.	90,000 min.	22% min.	—	15 ft.-lbs. @ −320F	20 ft.-lbs. @ −320F
Grade B 9% Nickel	65,000 min.	95,000 min.	20% min.			
HY-80 ¼"-2" Incl.	80,000/100,000③	—	19④	—	—	70 ft.-lbs. @ − 20F

①¾" and under—45% min.
②½" and over, yield strength range is 80/95,000 psi
③¾" to 1" inclusive, elongation 16% min.
④½" to 2" inclusive, elongation 20% min.
⑤¾" to 1" inclusive, 55% min.

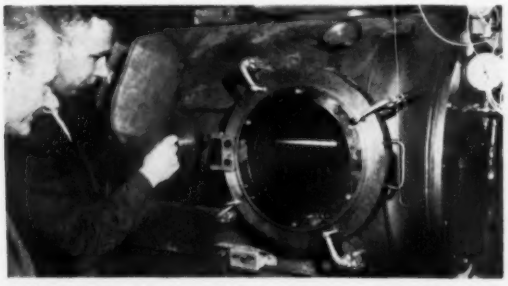
USS United States Steel

Stainless Steel 'Chutes

Answering one problem facing U. S. space exploration projects are stainless steel parachutes. Made of mesh cloth, the parachutes will be used to brake space vehicles for re-entry into the earth's atmosphere. The stainless cloth also resists corrosion and contamination from residuals blown off by rocket motors of the vehicle.

Engine Runs on Hydrogen

Completing a 100-hour test run in vacuum chamber is Avco Corp.'s 30 kw arc-jet engine. Operating on hydrogen, the engine produces about



ARC JET: 100 continuous hours on hydrogen.

one-lb thrust. Work is being performed under NASA and USAF contracts. One purpose of this work is to determine potential value of electrothermal propulsion for space flight applications.

Reduces Jet Noise

Have a noise problem? Jet noise can be reduced, it's claimed, by a recently patented system. It's an exhaust nozzle with a series of curved ridges and grooves along its inner cone. Jet gases, passing through the nozzle, are broken up into many small air streams flowing along the ridges and grooves. When the streams reach the open air, they mix together and reduce the noise level.

To Handle Space Programs

Congressional space experts continue to call for a shakeup of the federal agencies working on outer space programs. The House Space Committee recommends two offices be set up to handle space programs. One would be an office of space management, directly under the President. It would be charged with overall control of both civilian and military space programs. The other office would be a defense space agency, charged with developing military space systems for all three armed services.

Rocket for Private Use

NASA is mulling over a request from AT & T for a rocket to launch the first experimental communications satellite. However, the civilian space agency is not ready to hand out rockets for the private-satellite program. It is waiting for final approval from President Kennedy.

Lubricates With Air

Use of air as a bearing lubricant is expected to result in wider applications for this type of minimum-friction bearing. Just developed by Boeing is an externally-pressurized step bearing

BEARING: Runs on liquid nitrogen also.

whose load-carrying shaft spins freely on a cushion of compressed air. The Boeing design employs a single opening for the pressurized air.

Nuclear Power for Space

Recent breakthroughs in several fronts on direct-energy conversion promise to make nuclear-space power packages practical in the next few years. Plasma diodes, thermionic and thermoelectric devices are proving out in experimental operation. They will become an integral part of small fission reactors to be used for power in advanced satellites.

MIDVAC INCREASES STRESS RUPTURE LIFE 6 TIMES FOR JET TURBINE PARTS

MIDVAC STEELS ARE PRODUCED BY THE MIDVAC PROCESS OF CONSUMABLE ELECTRODE MELTING

When maximum reliability in the high temperature range and minimum rejects are required that's the place to specify Midvac Steels. These steels assure super alloys of increased tensile, higher impact properties, improved stress rupture strength at elevated temperatures and longer fatigue life.

As an example air melted No. 901 had excellent high temperature strength, but often failed slightly below the required stress rupture hours (15) with little to spare over the minimum ductility requirements. Well over 100 hours can be attained with Midvac melted No. 901.

The Midvac Process of consumable electrode melting eliminates atmospheric contamination, ingot soundness is improved, segregation is reduced, workability is increased and product quality is stepped-up. Midvac Steels are offered in many alloys as billets or forgings to meet the most critical design specifications of jet engine parts, missile and aircraft components and other products requiring properties beyond the capabilities of conventional steels. Let M-H metallurgists help you select the right alloy to meet your product's specifications. Write . . .

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New Powder-Metallurgy Process Makes Parts In Vacuum

One obstacle to low-cost nuclear power is the making of high-purity and easily machinable reactor parts.

A new vacuum powder-metallurgy technique hurdles this barrier.

By **R. H. Eshelman**
Machinery Editor

■ Competitive atomic power was given a push forward with the announcement of developmental production of a number of reactor parts of Zircaloy-2. The process? A modified vacuum powder-metallurgy technique.

General Electric's metallurgical products department, which is credited with the breakthrough, reports it's a superior technique for making finished or semi-finished shapes in refractory and reactive metals, alloys and carbides.

The major barrier to low-cost nuclear power has been the lack of manufacturing technology. High purity and density are required in a variety of exotic materials. Forming and machining such workpieces by standard methods have proven hard and costly.

Saves Costly Material—According to Henry DeLong, general manager of the Detroit department, the new process yields several advantages over standard produced material. He says, "This appears to me to be the kind of development that can save both industry and government tremendous amounts of money. It makes very efficient use of costly materials, and it saves much machining time after initial forming."

Although Mr. DeLong feels the

LARGE SECTIONS: Project manager Ralph Stuligross points out massive cross section and cored center of Zircaloy-2 to Henry DeLong, general manager, General Electric's metallurgical products department.

How Properties Compare

	Powder metallurgy tubing	Conventional tubing
Burst strength, psi	8000	7500
Ultimate tensile strength, psi	85,000	70,000
Elongation, pct	25	30
Hardness, Rb	87	87
Density, g per cu cm	6.57	6.57
Corrosion test*, mg per sq cm	19	19
Grain size, ASTM	7	6-7
Neutron cross-section, barns	0.18	0.18

*750°F steam at 1500 psi for three days

main impact of the development will be for nuclear-equipment, he also foresees other important high-temperature structural applications. Skip-glide type aircraft and reentry vehicles are some examples.

Much Development—For several years, the department has concentrated on making typical parts of zirconium and its alloys. Starting with sponge or powder they can work to 98 or 99 pct material utilization.

This compares with the 60-80 pct material utilization obtained with other techniques.

Many equipment items call for a large, heavy cross section with a large-diameter cored center. By starting with a solid chunk of metal or alloy, this means machining out a big cylindrical cross section.

Simplified Manufacture—Use of powder-metallurgy methods means elimination of most of the waste. For instance, standard production of a reactor-grade zirconium billet involves costly scalping, as well as coring before it's ready for extrusion.

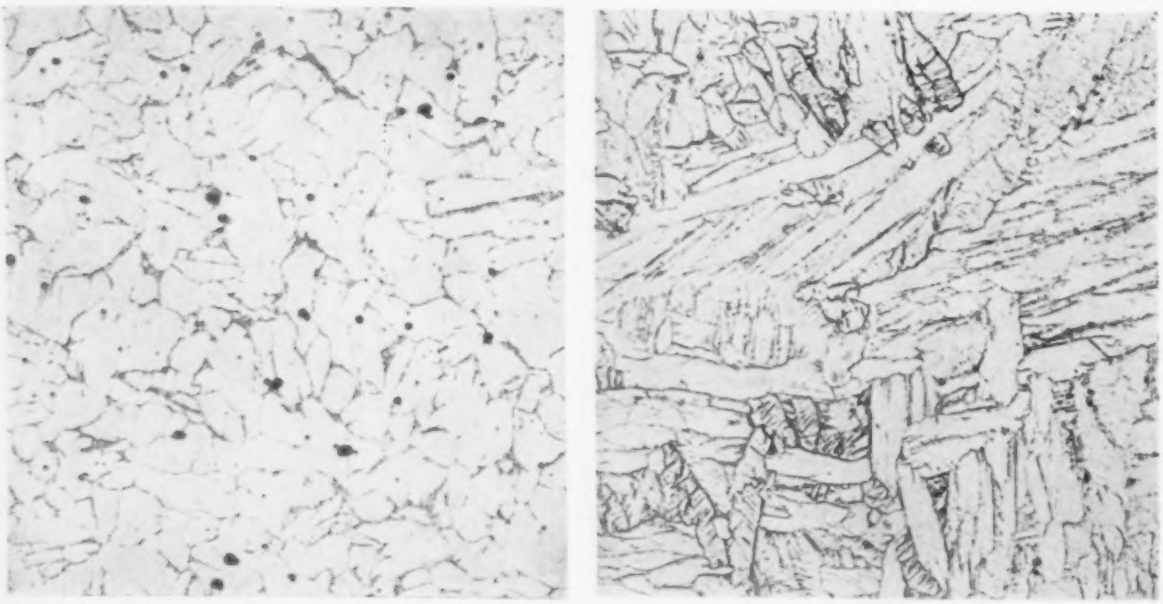
By the new technique, the billet is virtually finished as ejected from the forming operation; only light machining is needed. Many other types of pieces made of metals such as tungsten, columbium and molybdenum also offer attractive savings in materials, according to project manager Ralph Stuligross.

Commercial Uses — At present, many of these materials are finding wide applications in the chemical, aerospace, and military fields.

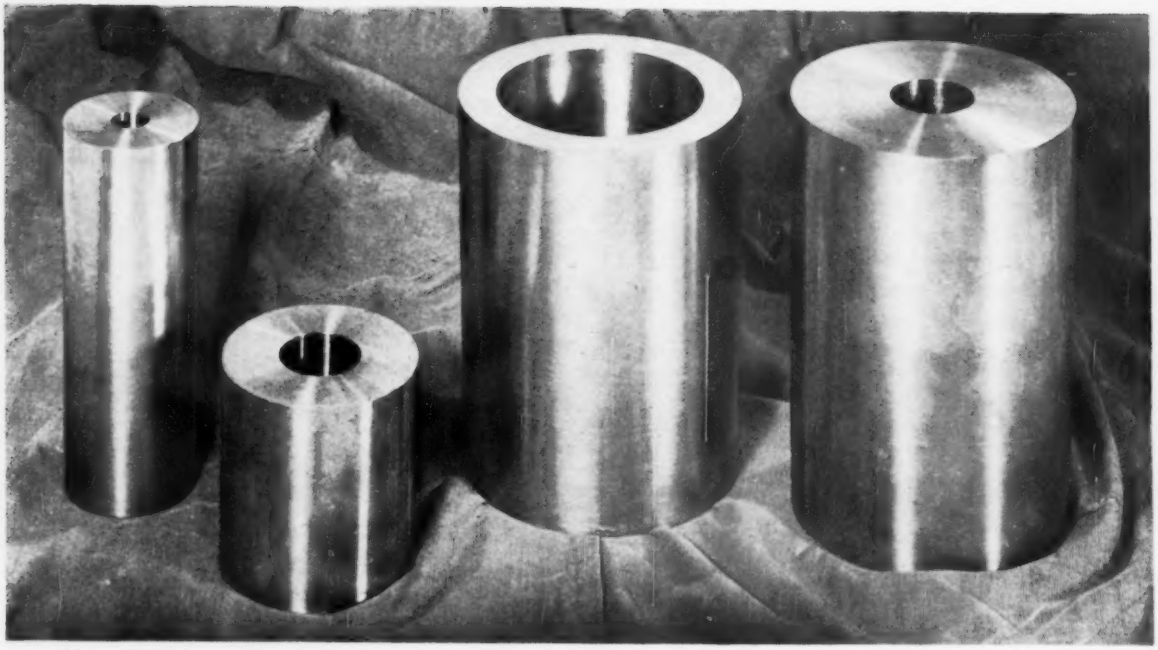
Zircaloy-2, for instance, offers much promise for nuclear equipment. It's being used as fuel element cladding, structural parts and supports.

It has a number of chemical applications. At room temperature Zircaloy-2 resists attack by most acids and alkaline solutions. It also withstands violently corrosive materials.

Physical Characteristics — Engineers of the metallurgical products department report that Zircaloy-2 parts, made by the new process, will meet all the stringent atomic-energy



SHOWS LESS POROSITY: Photomicrograph (right) reveals even grain structure of zirconium alloy made by modified, hot, vacuum-pressing technique. Note porosity in part (left) made by standard practice.



SAVES MATERIAL: Close tolerances, high density and purity, large openings are typical of Zircaloy-2 parts for nuclear reactors. New vacuum powder metallurgy process also gives high material utilization.

requirements. This includes certification for the Navy Mil Z nuclear specification.

The powder-metallurgy parts exhibit the same physical characteristics as the wrought product.

Density, for example, tests 6.57 g per cu cm—100 pct theoretical. The photomicrograph shows the material is entirely free from porosity.

Design Advantages—From a design standpoint, a big advantage of the hot-vacuum pressing process is that physical strength is non-directional; the microstructure is uniform throughout. Thus, there is no need for designers to compensate for directional weaknesses.

Here's another point. Many reactive and refractory alloys are difficult and costly to secure in pure billets of practical size; they are even more difficult to machine. Hence, the process opens up a number of possibilities—such as extruded tubing.

The close tolerances and fine dimensional control that can be achieved with the process affords the designer far greater scope and freedom than previously possible with these materials, indicate GE engineers. Even special shapes can be held to close tolerance.

Other Possibilities—New alloy and materials combinations are other possibilities. The new technique opens up the potential advantages found in dispersion strengthening and hardening. For example, some of these metals and alloys may be hardened by introducing into the powder mixture small amounts of oxides of aluminum or magnesium.

Check Analysis

Element	Analysis, pct
Tin	1.20-1.70
Chromium	0.05-0.15
Iron	0.07-0.25
Nickel	0.03-0.08
Zirconium	Balance

Also, the powder - metallurgy technique may be used to bond two pieces of the same alloy in complex parts with unusual interior openings.

Early experiments suggest that a virtual homogenous metal structure may be obtained. It may even become possible to join dissimilar-alloy parts.

Bright Future — Engineers and metallurgists point to columbium as one of the materials of the future for certain aerospace and nuclear applications.

It has a low neutron cross section. It can operate at higher temperatures. For these reasons it seems ideal for some superheated areas of reactors—for both commercial and military applications.

Until now, fabrication of parts has posed a problem. However, it now appears that the new process may well solve these problems.

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D-H Process: Vacuum Degassing Handles Openhearth Heats

Testing of the recently installed D-H unit is proceeding at a rapid pace.

Data to date show that it effectively degasses an entire openhearth heat at one time.

■ That the D-H process holds great promise for improving openhearth and electric-furnace steels is borne out by recently-released test data.

"Quality of steels approaches that of vacuum melted," adds E. A. March, director of technology, Crucible Steel Co. of America. Benefits of D-H treatment include: cleaner steels; close control of chemistry and pouring temperature; higher ingot-to-product yield.

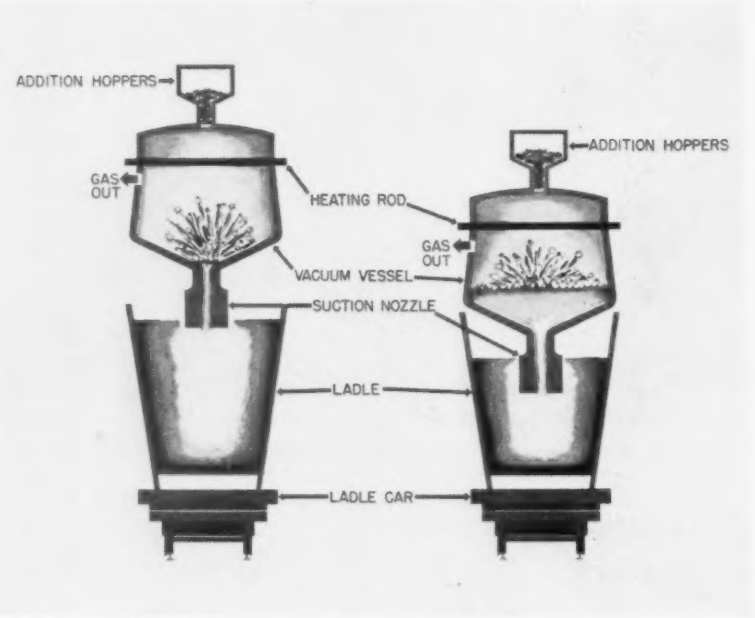
Tonnage is Factor — Degassing and alloying under vacuum are the reasons behind the D-H success. Another key feature is the tonnage that can be treated, up to 175 tons, in about one-half hour.

Behind the growing trend in vacuum-treated steels is the demand—particularly from the aircraft industry—for more reproducible and higher-quality steels.

By cutting down on gas content and non-metallic inclusions, vacuum melting or degassing or any vacuum technique meets these needs.

Present Evidence—The first D-H unit in this country was installed at Crucible's Midland, Pa. works in October 1960. Now, some 100 heats later, enough data has been amassed to show just what a D-H treatment can do.

The linecut shows how the process works. A ladle of molten openhearth or electric-furnace steel moves under the vacuum chamber. It is then weighed so that proper alloying additions can be made.



HOW IT WORKS: Up and down movement of vacuum chamber causes successive batches of molten steel to spill into chamber for degassing.

The snorkel tube then lowers. When the tube is below the slag, the pumping system is turned on. Pressure in the chamber rapidly lowers to about one millimeter. Result: Liquid steel rises about 60 in. above the level of the steel in the ladle.

Degasses Steel Droplets — Next, the degassing chamber lowers hydraulically; and molten steel spills into the vacuum chamber for degassing. When the unit is raised, the degassed steel flows back through the snorkel into the ladle.

It takes about 30 such cycles to degas 175 tons of steel. During each cycle, carbon heating rods in the vacuum chamber maintain the steel at the proper temperature.

Alloying then occurs during the next few cycles; ingredients enter the top of the D-H unit through vacuum hoppers. When alloying is completed, nitrogen is introduced to bring the chamber up to partial pressure before raising the snorkel above the slag line.

The ladle of steel is then teemed in a normal manner. Though mainly interested in high-alloy steels, Crucible has treated a number of steels in this way. Included are: 1020, 1085, 4340, 8620, 52100 and H-11. What are the findings? C. D. Preusch, manager, technical development, cites these results.

Reduce Gas Content—"Oxygen reductions are substantial." They range from 55-90 pct. (The greatest reduction occurs with heats initially high in oxygen.)

The lower chart traces the reduction of oxygen of a blocked openhearth heat during D-H treatment. Early high levels are quickly re-

duced. But oxygen reduction is significant in later cycles also.

How about other gases? "Hydrogen is effectively removed by the unit," states Dr. Preusch. Other tests confirm this. Nitrogen? The unit makes significant improvements only when the heat is initially high in nitrogen.

Extract Nonmetallics — Several special techniques were used by Crucible to supplement the testing for gas content. One is the electrolytic extraction of nonmetallics.

This process calls for completely dissolving one-half a billet disk, then weighing and analyzing the residue. All forms of oxide inclusions are recovered. The top chart shows that D-H treated openhearth steels have about one-half that of normal openhearth steels.

Composition control is easier than with openhearth heats, according to Dr. Preusch. Crucible test data show that making alloy corrections by minor additions through the D-H unit results in heats with ladle chemistry very close to that desired.

"Recovery of alloys is high and consistent." Silicon-100 pct; chromium-97 pct; manganese 80-100 pct for small additions, 95 pct for larger additions.

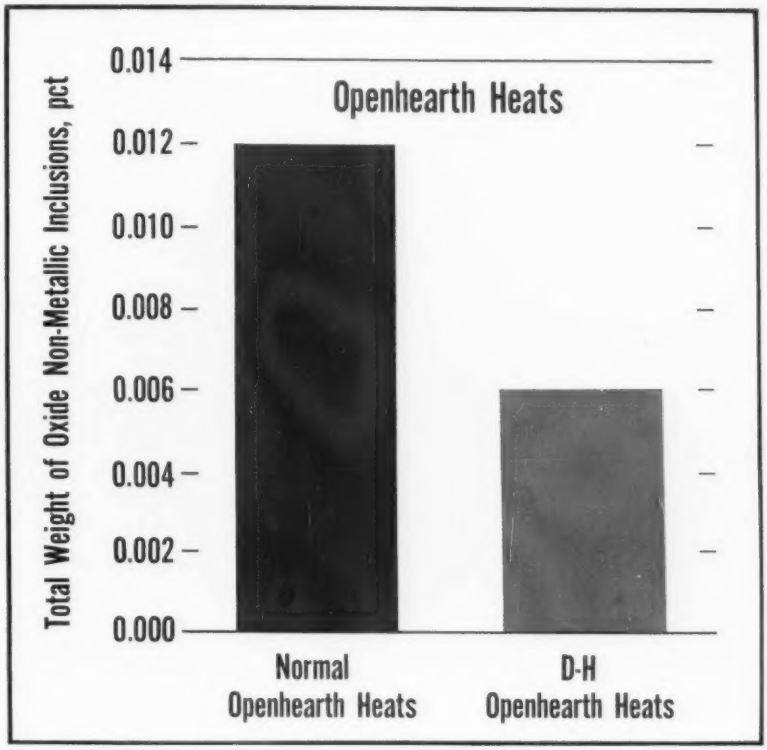
Other Tests—Results from tests most commonly used to evaluate steel quality are also cited by Dr. Preusch.

"Grain size is consistently fine and normal, he reports. "Hardenability is normal. Macroetch is good; the center soundness of large blooms shows definite improvement."

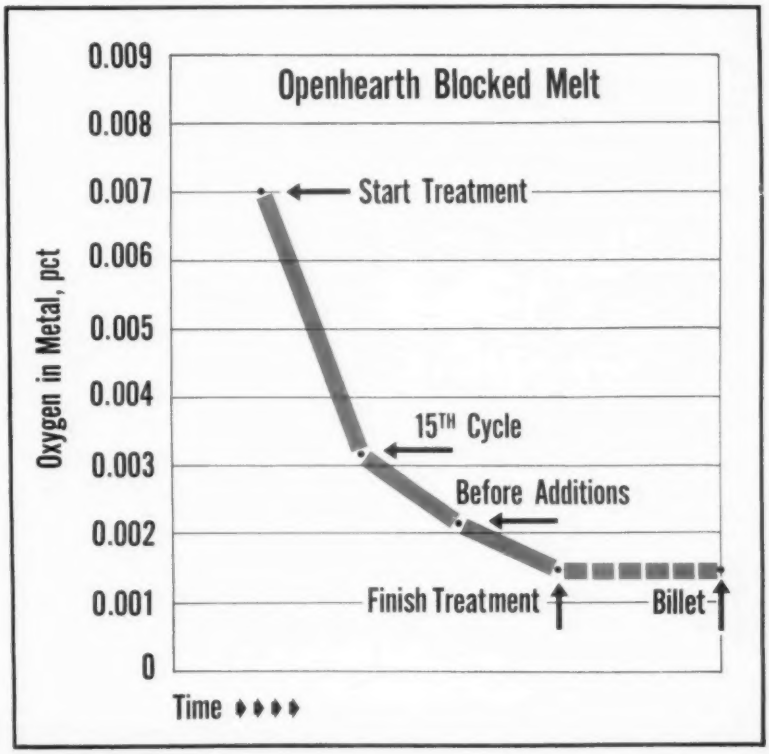
For the Customer—"The pay-off for the customer, of course, will come primarily from improved properties and reliability," adds Dr. Preusch.

"Reliability" includes less rejections in the fabricator's plant, and less failures. One test used to anticipate reliability is transverse ductility. Treating by the D-H process shows improvement here also.

Lowers Oxide-Inclusion Content



What Happens to Oxygen



End White-Layer Problems On Nitrided Parts

By **R. F. Erxleben**, Metallurgist—National Broach & Machine Co., Detroit

A white layer is always associated with nitriding. How is the layer best removed?

One company lends its Ban-Wite process to rid the layer and increase the case depth.

■ Nitriding is an excellent way to heat treat certain steels. In an ammonia atmosphere, the process gives a good, hard, wear-resistant nitride case. However, in nitriding, two distinct layers form—one, an undesirable "white" layer and the other a desirable layer containing the nitrides of the alloying elements in the steel.

It's the white layer that can't be tolerated on parts that go into aircraft assemblies and other critical uses. There's only one thing that can be done to remedy the condition, and that is to remove the white layer.

Grinding Costs—One way to remove the layer is by grinding. This can be a costly and time-consuming process often requiring special machinery.

Due to the layer's brittle state, many times surface cracking or otherwise objectional surfaces result from grinding.

Recently, National Broach & Machine Co., Detroit, developed a heat-treating process that effectively removes the white layer. The process is called Ban-Wite. It's easy to perform and eliminates any risk of part rejection due to cracks.

The freshly nitrided part is simply coated with an impervious, heat-resistant material and heated under controlled conditions in a suitable furnace. Time at temperature does the rest.

Coating—A Must—Electroplated copper or bronze or a tin-base paint can serve as the coating, since both will protect the metal part's surface from the effects of the heat, and at the same time, prevent nitrogen loss. This loss could cause the case to become soft.

The coating material must be thick enough to withstand prolonged temperatures up to 1100°F. National broach uses 0.002-in. copper plate to do the job. Once coated, gas or electric furnaces can apply the heat. Salt bath studies are already underway. Heating time depends upon the thickness of the layer, the metal's constituents, and temperature.

The approximate time needed to remove a white layer from a coated nitrided steel is two hours for each 0.0001 in. of layer thickness.

After heat treating the part, its coating can be removed with an acid bath or any normal stripping compound.

A Few Cases—Pump gears made of modified Nitralloy 135 have a white layer 0.0006 in. thick after nitriding. This alloy contains 0.40-0.70 pct Mn; 0.20-0.40 pct Si; 0.38-0.45 pct C; 1.40-1.80 pct Cr; 0.85-

LOW COST: The Ban-Wite process is an inexpensive method of removing white layer from nitrided steel parts. The method can also be used to deepen the case on aircraft parts such as gears, master gears and bearings.

1.20 pct Al; and 0.30-0.45 pct Mo.

The part was copper plated to a 0.002-in. thickness and heated at 975°F for 15 hours. The result: White layer was completely removed from the pump gear.

In another case, a shaft made of SAE 4340 steel had a 0.0015-in. thick white layer. This steel contains 0.60-0.80 pct Mn; 0.20-0.35 pct Si; 0.38-0.43 pct C; 0.70-0.90 pct Cr; 0.85-1.20 pct Al and 0.20-0.30 pct Mo.

After plating with copper to a 0.002-in. thickness, the part was heated at 975°F for 40 hours to completely remove the white layer.

Cost Is Low — The Ban-Wite process is an inexpensive method of removing white layer from nitrided steel parts. The method also deepens the case on nitrided parts and may be applied to accomplish this end.

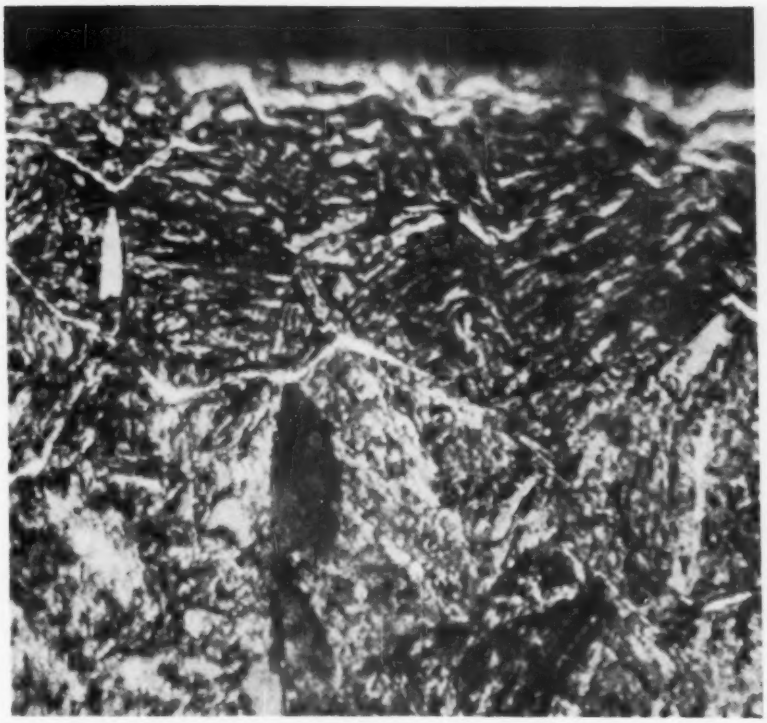
The case-depth increase is attained by the decomposition of the iron nitrides in the white layer and diffusing the liberated nitrogen further into the surface of the material.

Aircraft gears, master gears and bearings are ideal applications for nitrided parts from which the white layer must be removed.

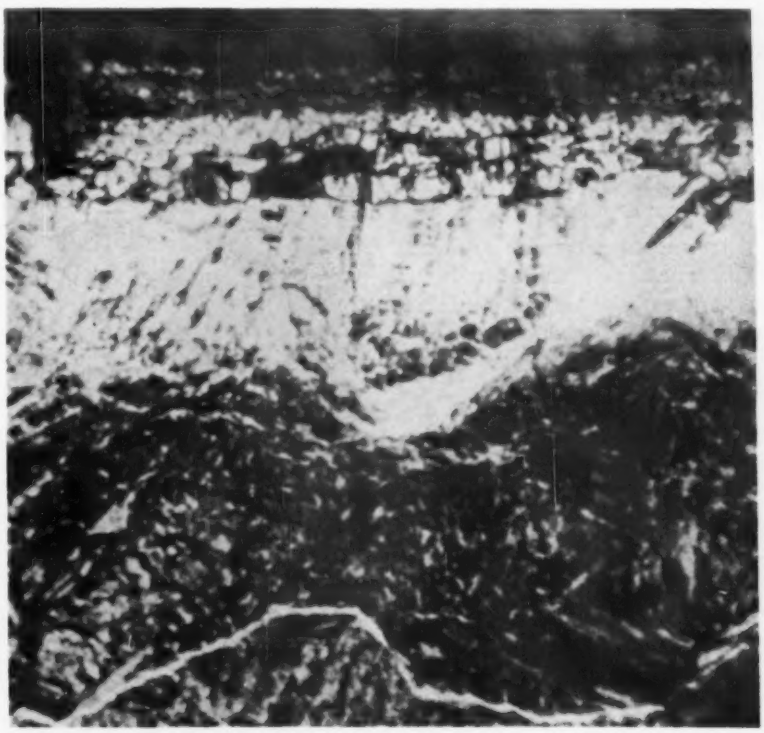
First Try—Earlier methods removed about one-third of the iron-nitride layer. This was done by tempering the part without a coating. Higher temperatures brought on excessive de-nitriding of the surface causing a soft surface with imperfections.

The process is available to industry through a licensing arrangement. National Broach also performs the Ban-Wite process in its own heat-treat department for manufacturers on a contract basis.

The outstanding properties of nitrided steels are their high surface hardness and wear resistance. They also retain their hardness at elevated temperatures. Another point in nitriding's favor is the fact that no heat treatment is needed. This simplifies the process since it avoids the dangers of warping during quenching.



CLEAN SURFACE: Results of Ban-Wite process emphasizes the method's ability to rid the white layer from nitrided steel parts (500X). Iron nitrides in the white layer decompose, diffusing nitrogen into the part's surface.



BEFORE RUN: Nitrided part has 0.0016-in. white layer and 0.020-in. nitride case before it undergoes final processing (500X). The outer white layer is usually brittle and cannot be tolerated on aircraft parts.

Dynamic Honing Rids Trouble In Hydraulic Fluid Lines

By **C. A. Balman**—Mfg. Develop. Engineer, Convair/Pomona, San Diego

It's a known fact that tiny specks of contamination in the hydraulic lines of spacecraft might cause failure.

Tailored to this job, dynamic honing solves that problem.

■ One of the chief reasons for missile failure is the contamination of hydraulic lines by foreign particles. Post mortems of faulty equipment have often shown that the guilty particle couldn't even be seen by the naked eye. Nevertheless, it was big enough to keep a valve open when it should have been closed.

Where was the heart of the problem? At Convair/Pomona, Convair Div. of General Dynamics Corp., San Diego, we knew which area to hit. The hydraulic passageways would have to be cleaned more thoroughly.

Manufacturing processes, once their jobs are done, leave many particles in the passageways. Conventional cleaning methods just won't clean them well enough. These residual particles are then often dislodged from the walls in the hydraulic parts by the normal flow of the hydraulic fluid through the system.

On the Beam—The new cleaning system at Convair/Pomona is dynamic honing. With it, the finished product leaves nothing to be desired. The internal surfaces are free from scratches and pits. The inside even looks like a burnished surface.

As far as cost is concerned, the new dynamic honing technique takes 75 pct less time to produce a cleaner surface than the best of the methods formerly used.

From the outset, we knew we had to find the proper tooling and methods that would deburr passageways and intersecting holes in our manifold system. We soon found that other companies were faced with the same problem.

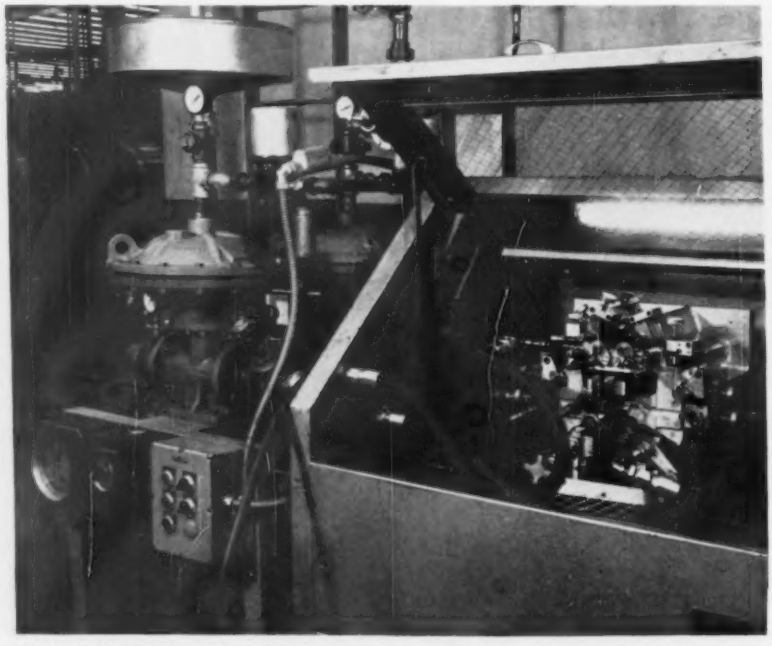
By Hand—Small hand tools, similar in appearance to dental tools, are sometimes used to clean the passageways. These tools are designed and sharpened by the worker on the job.

With a borescope, the worker examines the internal surfaces for burrs and other protrusions. He then figures the depth of the area in his head and selects the proper tool to do the job.

This procedure removes the burrs but leaves scratches in their place. To remove the scratches, a motor-driven wire brush is used to polish the affected area. You take a chance here, though. More scratches might result if the wires break off. To sum up, the hand method is very slow. Then, too, the finished job is often of poor quality.

Many other cleaning methods were also tried. In one of them, Emery or Crocus cloth was attached to a wire, then moved back and forth over the affected area. In another method, a string was bonded to an abrasive. The string was pushed into the passageway to the intersection. It was then pulled around the corner through an intersecting hole.

Low Ceiling — Unfortunately, hazards were involved with the



FIRST MODEL: Initial dynamic honing machine is now engaged in normal routine work. Its results cannot be achieved by any other known method.

abrasive technique. Also, it did have its limitations. Since the method was only partly successful, it was ruled out.

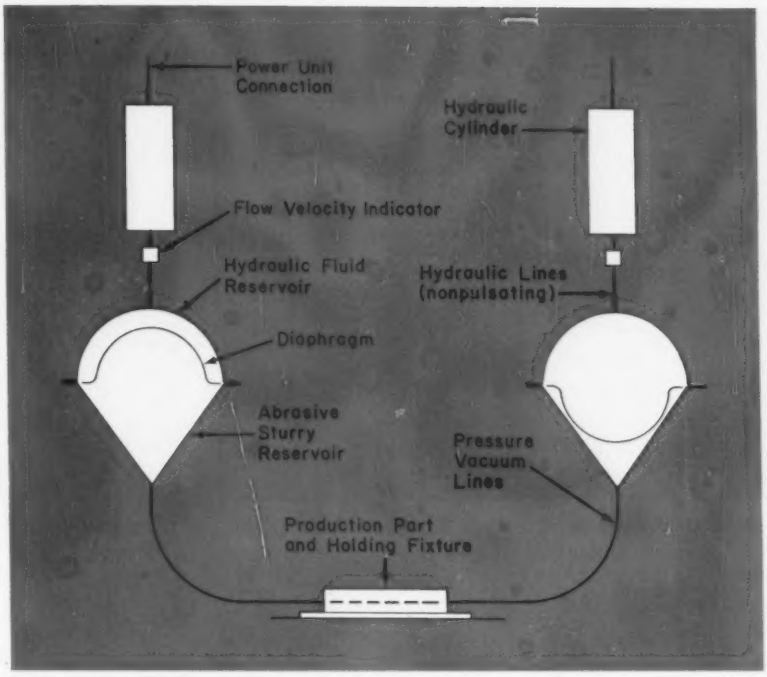
The next attempt involved what might be called wet sandblasting. Fluid and abrasive were mixed and then blown through the passageways. Probes directed the mixture. This method did remove the large burrs, but pits tended to form in the sidewalls of the passageways. These pits contained abrasive particles.

The pits were so firmly embedded that they could not be removed by the most modern cleaning methods. At this point, we decided to seek a means of circulating a liquid that contained abrasive.

Good Sign—With the same type of machine used in the previous test, we just pumped the slurry. No air blast was employed. The polished finish began to look like a burnished surface. However, there wasn't enough pressure to erode the burrs.

The use of wire brushes, abrasive cloth, steel wool and the blowing of vaporized abrasives into the passages at proper speeds all led to further problems. In these attempts to cut metal, pits were created in the walls and foreign objects became embedded. The objects were often dislodged later by the normal flow of hydraulic fluid.

Nine Features Are Essential



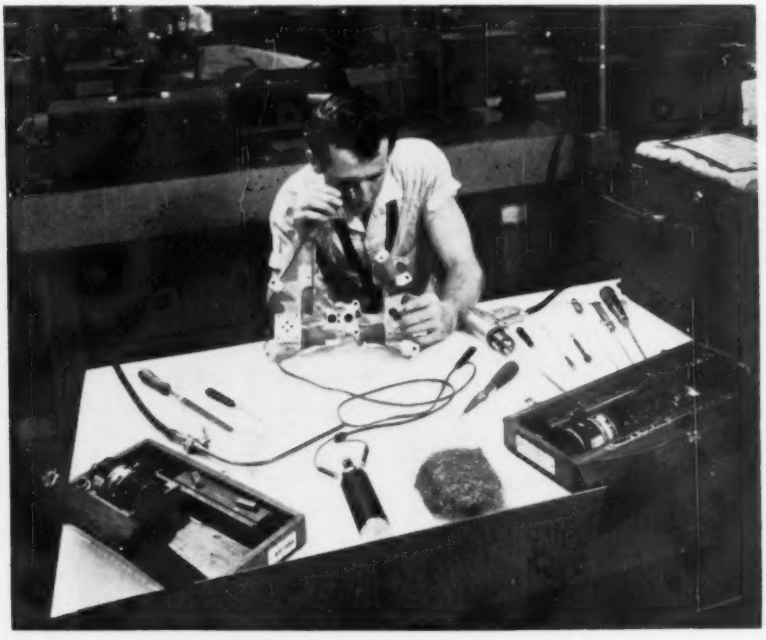
With each succeeding failure, we became firmly convinced that no machine on the market could perform the required task.

Proper Focus—The search began for a pump that would direct the abrasive slurry at a pressure suitable to deburr and polish. One was found, but we needed even greater controls. At this point, however, we knew we were on the right track.

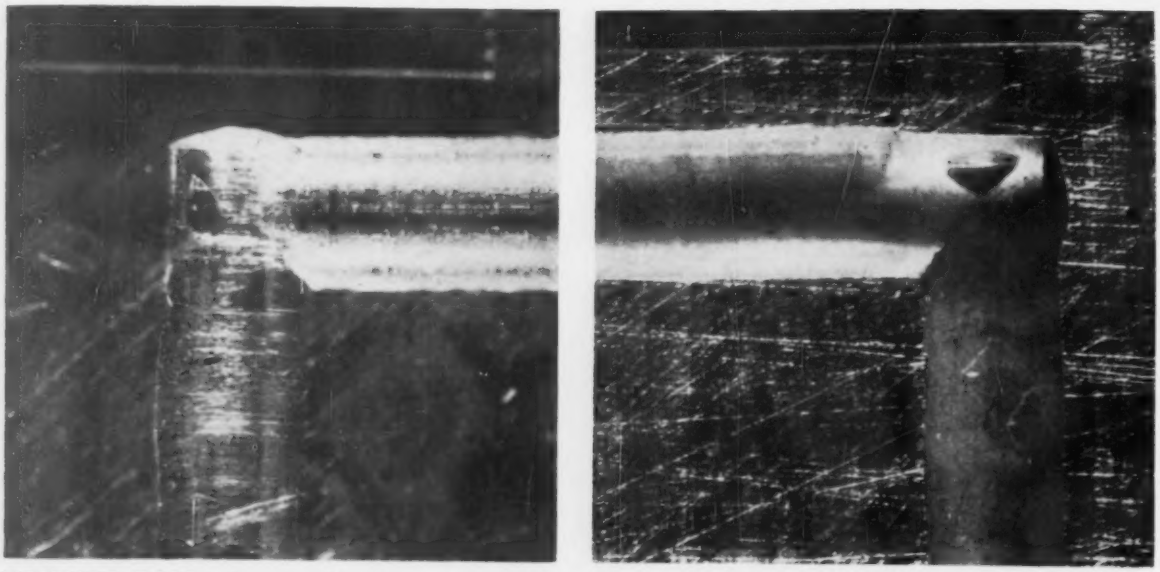
Since the machine we needed was not on the market, engineers at Convair/Pomona had to build it themselves. What happened to the slurry when it moved through the passageways? By pumping the slurry through transparent plastic test blocks, we could actually see what was going on.

Point A in Fig. 1 shows how the slurry seemed to move around the edges at the entrance of the smaller holes. Two things happened. First, erosion started to build up around the entrance to the smaller holes. At the same time, the burrs were bent into the smaller passageways.

Shoved Around—At Point B in the same figure, the slurry pushed



MANUAL APPROACH: Former method of cleaning passageways involved the use of hand tools. Burrs were located through the borescope.



HONING'S ROLE: Compare honed section (right) with ordinary drilled and reamed 0.093-in. hole. Note how particles cling to the walls. Also, note tool marks. Particles are only visible under magnification.

the burrs into the larger hole. Although some ambient movement was noted around the jet-like flow through the small hole, there was no erosion around the stream.

At Point C you can see that the burr diverted the flow of the abrasive away from the sidewall of the small hole just behind the burr. If this one-way flow were to continue, a pit would form at that point.

These facts pointed to one solution. We had to alternate the directional flow. Other points such as velocity and pressure were also taken into consideration before designing the honing setup.

Fixture and Hose—Of course, the fixture had to be leakproof. At the same time, the fixture had to provide for quick attachment to the part. The hose in the pressure-vacuum lines had to be non-pulsating. The diaphragm should serve two purposes.

It should flex with the movement of the slurry. It should also seal the two parts of the pressure pot (one for hydraulic fluid and the other for the abrasive slurry).

To ease the control of the abrasive action in the production part, a flow velocity indicator was needed. By use of a conversion chart, the speed through a given size orifice can be converted to surface feet per minute. Then it can be controlled by a power unit.

Two-Way Motion—A hydraulic cylinder was also incorporated into the system. This particular addition pumps the hydraulic fluid in and out of the pressure pots. As a result, the abrasive slurry can be pumped through the production parts and returned.

The power unit is both dual and synchronized. As such, it can control the wall pressure in the production part. It also pushes the fluid through the line or moves the opposite cylinder.

All things considered, a hydraulic unit is the most desirable type of power unit. By use of flow control valves, the required settings are easily accomplished.

A patent on the dynamic honing machine has been applied for and assigned to Convair.

Slurry Sets Up Flow Currents

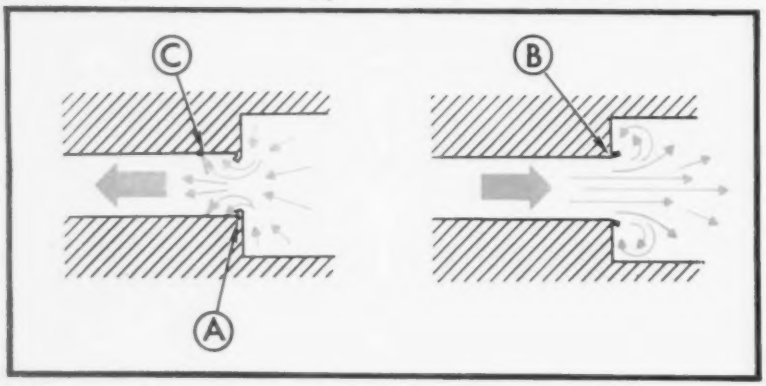
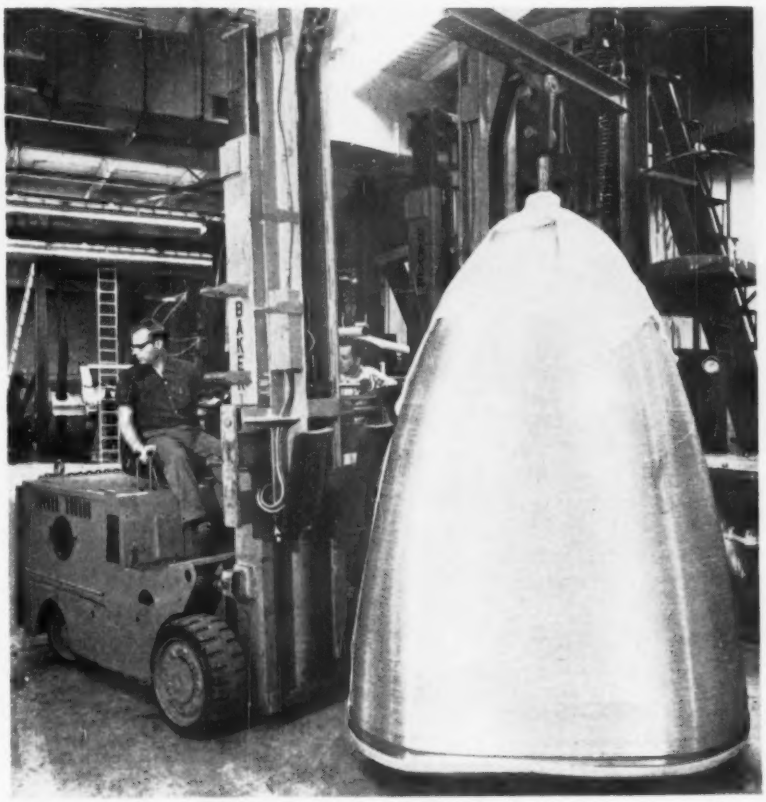


FIG. 1: At point A, slurry eroded the entrance to smaller holes and bent burrs into smaller passages. At B, slurry pushed burrs into larger holes, while at C the burr diverted flow away from sidewall.

How Radomes and Nose Cones Are Handled With Care

Making a precision part is one thing, but moving this costly component is something else.

The best way to keep good craftsmanship intact is to ensure foolproof handling methods.



SAFETY IN NUMBERS: Two electric lift trucks, linked together by a coupling device, transport 13,000-lb radome from a winding machine.

■ You hear a great deal these days about the precision required in the manufacture of parts for missiles and aircraft. Did you ever stop to consider how some of these costly parts are moved from one section of the plant to another during production?

That same question bothered the production men at the Brunswick Corp., Marion, Va., until they came up with an ingenious solution. They coupled two electric lift trucks. As a team, they shift among the plant's eight production stages, handling delicate, heavy and costly radomes and nose cones.

The slightest dent or bend in wall thickness can cause part rejection. The weight of the mandrels (between 300 and 13,000 lb) makes handling that much more difficult. Nevertheless, the Siamese trucks seem to have the problem beaten. The trucks are made by Baker Industrial Trucks Div., Otis Elevator Co., Cleveland.

On a Dime—The toughest job in the plant for the lift trucks is placing the mandrels in the rotary tables of the precision grinders. Here, accuracy must be maintained. Conventional controls at the driver's seat will never give you that kind of accuracy.

As a result, each truck is equipped with detachable remote-control boxes. Using the controls, the operator can position himself within inches of the exact point where the part is to be placed. Then he can control all movements of the part within thousandths of an inch by a fingertip touch on the control button.

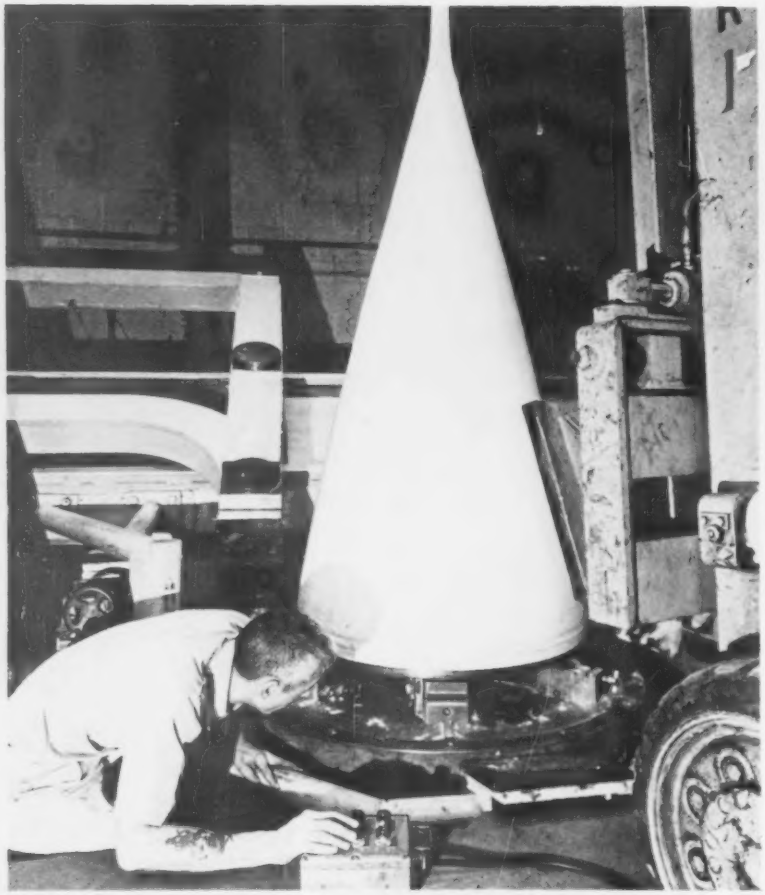
First stop for a truck is the part removal area where it picks up a bare iron mandrel. The truck carries the mandrel about 100 to 200 ft through narrow aisles to a grinder. At this point, the mandrel is read out with micrometric indicator gages to establish a basis for measuring the precise part thickness required.

Filament Winding — Thus completed, the truck moves the mandrel another 150 ft from the grinder to the winding machine where the first layer of fiber glass is applied. The remote controls are put to use at this station to insure accurate positioning.

The next move is to the curing oven where the partly built-up component is cured at high temperatures. Distance to the curing oven is about 200 ft.

After hardening, the part, still on its mandrel, is carried another 200 ft to a grinder where it's given preliminary smoothing. Then the assembly goes back to the winding area for final thickness buildup. Following final winding, the part and mandrel are taken to the curing oven for final hardening.

End of the Road—Once curing is over, the assembly returns to the



HEAD OF A PIN: Remote controls permit operator to position radome-mandrel assembly on grinding table within thousandths of an inch.

grinders where the part is finish ground to specified wall-thickness tolerance. The part is now ready to be removed from the mandrel, tested and shipped.

The truck moves the assembly to the separating stand where hydraulic pressure is used to remove the part from its mandrel. The mandrel is ready to go through the whole cycle again. The radome is sent on for final exterior covering and testing for "boresight" aiming of radar impulses on Brunswick's own test range.

The plant assigns two of its most highly skilled drivers to operate the trucks. The average under-load speed is about 10 fpm. This allows time for the careful maneuvering required. They can go faster but the heavy mandrels tend to develop too much pendulum action at the higher speeds.

According to Horace Huff, project engineer, "Both units together operate an average of about 12 hours every 24. On this basis, we estimate that the two units have amassed a total of 4500 hours to date. One of the trucks has been in service for two years. We've been using the other truck for about one year."

TRUE HARMONY: Operator adjusts pin in bar-coupling device which holds trucks together.

FINAL ATTACHMENT: Once the eyebolt is attached to radome, the truck moves it from grinding station.

FASTER FILLETS: Welding jig positions part at 15° from the horizontal. The weld metal is deposited in the semivertical position at a speed of 50 ipm—almost three times faster than manual welding.

Switch to Semiautomatic Welder Speeds Railcar Assembly Work

By **M. H. Waggener,** Field Engineer, The Lincoln Electric Co., Detroit

Semiautomatic welding can lead to economy on many jobs.

In assembling auto carriers, it combines the efficiency of automatic welding with the flexibility of manual welding.

■ Management personnel at Whitehead and Kales Co., River Rouge, Mich., took a second look at a new product design setup in their shop. They used the chance to explore new manufacturing processes. The result: A significant reduction in welding costs.

On one job of welding cross members, the use of a semiautomatic arc welder, supported by a vapor shield, tripled manual welding speeds. The new product, an 85-ft triple deck railroad car, can carry 12 full-size autos.

Manual arcwelding was first used on the structural shapes that make up the framework. The railcar's design calls for a 3/16-in. plate to run the full length and width of the upped decks. They are reinforced by welding channel sections to the undersides.

The lower deck of the tri-level rack, the backbone of the entire assembly, contains heavier structural elements. The longitudinal members are 2x3x¼-in. angles. Lateral components are 8-ft long custom fabricated I beams. These were coupled to add rigidity.

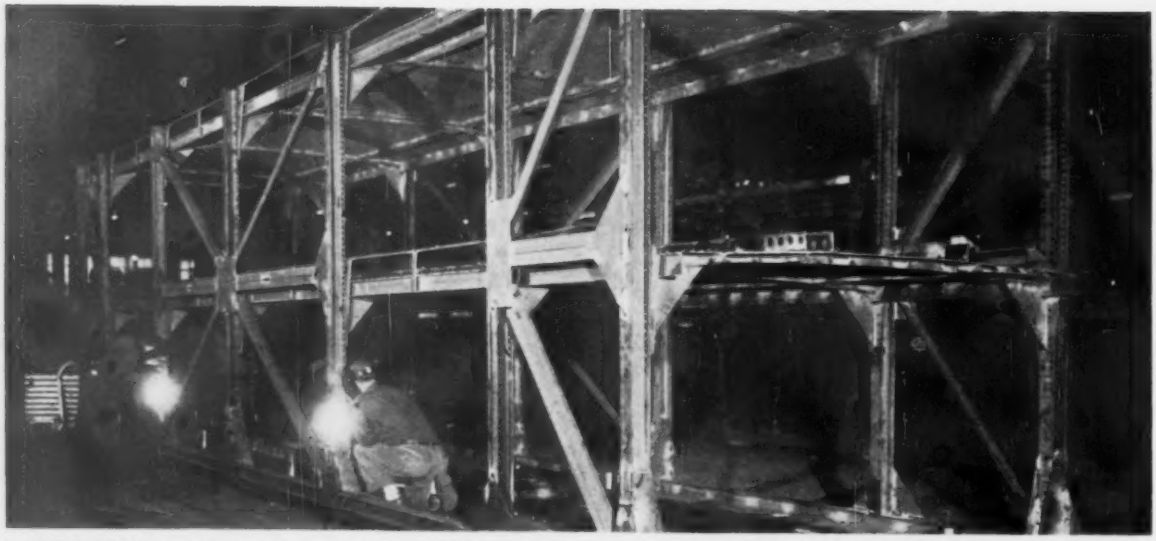
Think Again—The high production volume of these I beams and the large footage of weld required for each unit, 34 ft of ¼ in. fillets, made Whitehead and Kales thoroughly examine production plans.

Mechanized welding was needed —but which process? Diversified shapes called for flexible units. In addition, the schedule permitted only a short operator training period.

Inner shield semiautomatic squirt welders were selected to meet the requirements.

Self-Shielding Rod—This semiautomatic welder employs a vapor shield to protect the weld puddle as the pass is made. Here, a tubular self-shielding electrode feeds continuously through a welding gun that's manually supported and guided along the joint. The rod requires no fluxing materials such as gas, granular fluxes, or wire coatings.

Two welding stations were equipped with the squirt welders. In addition, a tacking jig was designed and constructed for preas-



TAKES SHAPE: Standard manual arc welders join components into a completed subassembly. Two such units make up the 85 ft tri-level. The units are then picked up with a crane and loaded on flat cars.

FAST DELIVERY: Fabricated railcar carriers can handle 12 full-size autos —a show of top efficiency by today's modern railroads.

sembling the I beams prior to final assembly.

Production sequence involves four men. One man continually tack welds the assemblies together. The other three men rotate between two welding units and the jig moving job. This results in an efficient four-man team.

With this arrangement, an 80-pct operating factor (arc time per cent of overall time) is achieved. This more than doubles the operating factor normally found with manual welding.

Fast Joint Fill — The electrode selected has a fast-fill arc characteristic. It also suits poorly fit joints and helps to resist porosity when encountering rust or mill scale.

A machine setting of 550-amp dc at 34 v deposits the ¼-in. fillet running downhill at 50 ipm. This is more than three times faster than normal manual welding speed.

The three operators deposit 900 lb of rod on an 8 hour shift. Each machine averages 25 lb per hour. The high welding rate also minimizes the heat-affected zone and makes it unnecessary to develop a welding procedure to control distortion.

The finished unit is picked up and attached to a flat car.

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NEW PATENTS

Aids Ore Reduction

Ore reduction apparatus, T. H. Whaley (assigned to Texaco Development Corp.), Mar. 28, 1961. In the reduction of iron oxide ores in a fluidized bed reactor, this apparatus separates the effluent gas from the first reduction zone, purifies it of water and carbon dioxide, and recycles it to the first reduction zone. U. S. 2,977,216.

High-Strength Casting

Method of producing a high-strength ferrous metal, W. B. Larson, R. F. Thomson and F. J. Webbere (assigned to General Motors Corp.), Apr. 4, 1961. This method produces a ferrous-metal casting that has a high modulus of elasticity, good tensile strength and high yield strength in the as-cast condition. It uses a melt containing 1-2.5 pct C, 1.5-3.2 pct Si, not over 1.15 pct Mn, 0.001-0.05 pct B, and the remainder essentially all Fe. This melt is superheated to 2900°-3100°F; then poured at 2600°-2800°F. U. S. 2,978,320.

Sintering Process

Sintering process and apparatus for producing hard pellets, A. Huber (assigned to Metallgesellschaft A.G., Frankfurt on the Main, Germany), Mar. 21, 1961. In a sintering apparatus for hard-burning iron-ore agglomerates at high temperatures, reinforced hollow beams through which air or other cooling gas is forced support the grate bars. The bars themselves are not cooled directly. U. S. 2,976,-029.

Preliminary Metal

Method of preparing preliminary metal or steel pig iron containing phosphorus, J. Kosmider and H. Neuhaus, Apr. 11, 1961. In the production of a preliminary metal from pig iron, adding powdered lime or soda to the melt reduces slag surface tension. Or, a borax or fluoride flux is added to increase surface tension. The object is to gain the best foam formation for the given conditions of bath depth and converter capacity. U. S. 2,-979,395.

Concentrates Ore

Method and apparatus for concentrating and separating ore, N. H. A. Rodman and A. Arbetman (assigned to Oreclone Concentrating Corp.), Apr. 4, 1961. A multi-stage centrifugal apparatus and method beneficiates wet iron-oxide ores that are high in silica and other impurities. U. S. 2,978,100.

Iron Welding Rod

Ductile-iron welding rod and method of welding, R. F. Sherwin and S. J. Marabella (assigned to Chicago Hardware Foundry Co.), Apr. 4, 1961. A ductile welding rod consists of 2.75-3 pct Si, 0.2-0.4 pct Mn, 3.5-4 pct total C, 0.02-0.06 pct P, 0.05-0.1 pct Mg, 0.02 pct S maximum, and the balance essentially all Fe. U. S. 2,977,676.

Low-Alloy Steel

High-strength, low-alloy steels, W. H. Chang (assigned to General Electric Corp.), Apr. 4, 1961. An easy-to-fabricate structural steel comprises 0.5-2 pct Mn plus Mo plus V, 0.45-0.55 pct C, 4.5-7.5 pct Ni, 0.75-1.25 pct Cr, 1.75-2.25 pct Si, and the remainder Fe and incidental impurities. U. S. 2,978,-319.

Separates Ore

Ore separating apparatus, B. F. Hearn (49 pct assigned to H. J. Valentine), Apr. 11, 1961. For beneficiating iron ores, an apparatus separates the different components by an air stream on the basis of specific gravity. This process is followed by magnetic separation of iron values from non-magnetic gangue. U. S. 2,979,197.

Copies of U. S. Patents are available at 25¢ each from Commissioner of Patents, Washington 25, D. C.

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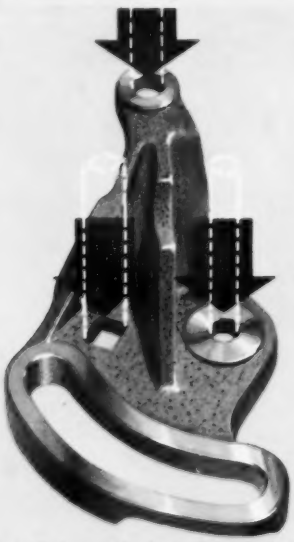

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Prevents Corrosion

New coatings, that provide an effective barrier against capital-shrinking corrosion, are the subject of 4-page brochure. It tells what the coating is, and what it can do. It also includes complete instructions for application and some photos of actual applications after treatment and exposure. (Permaspray Co. of Leonetti Enterprizes)

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Sling Chains

The publication of a new catalog covering an entire line of wrought-iron and steel sling chains has recently been announced. In addition to complete descriptions and tables of specifications for all types of slings, the catalog includes a glossary of chain terms and industry coding symbols in an easy-to-understand form. (Campbell Chain Co.)

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Heavy-Duty Lathes

An illustrated bulletin describes a line of small (20 hp), heavy-duty lathes. The lathes are available in four sizes. They offer 27 spindle speeds and 60 thread changes. The bulletin also gives specifications. (R. K. LeBlond Tool Co.)

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Meters Moisture

The contents of a descriptive brochure is devoted to the salient features of a portable laboratory moisture meter that was introduced in March. This instrument suits many applications including the monitoring of gas in purge systems, measuring moisture in helium and monitoring gas dryers in laboratories. The brochure passes on general information, photos and specifications. (Beckman Instruments, Inc.)

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Rust-Banning Coolant

A brief bulletin outlines the properties and uses of a new coolant that's free from salt-depositing characteristics. The coolant offers excellent rust-inhibiting properties for machining and grinding ferrous metals. (Baker/Gubbins Co.)

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Ultrasonic Cleaners

Ultrasonic cleaners are the subject of a 2-color folder. It elaborates on the advantages of a transistorized design that eliminates vacuum tubes. The line has a self-tuning feature that matches the generator output to the characteristics of the material being cleaned. (Acoustica Associates, Inc.)

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Welding Positioners

A 28-page article discusses welding positioners, the many features that are necessary, and how these features work for the user's benefit. The article tells how to apply positioners for increased profits. Also included are comprehensive specifications on 1000-24,-000-lb capacity models. (Aronson Machine Co., Inc.)

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Shipping Room Aid

An attractive and informative 4-color wall chart illustrates the simplicity of box closing using a single-strip application of reinforced sealing tape. It mounts on

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the shipping room wall, and provides instructions on storing and handling the tape. It also lists all carriers authorizing the use of reinforced tape and the appropriate Federal specifications covering the product. (Atlantic Gummed Paper Corp.)

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Cleans Circuit Systems

This new bulletin reports on an automated, printed - circuit cleaner system that combines the properties of "Freon" cleaning agents with ultrasonic energy. It removes both activated and non-activated fluxes and other contamination from assembled printed - circuit boards. (National Ultrasonic Corp.)

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Aluminum Supplies

Two brochures have recently been issued; one describes aluminum ingots, the other aluminum billets. Data on availability, nominal analysis and typical mechanical properties aids selection of the proper alloy. (Briel Industries, Inc.)

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Castable Refractories

Newly revised, a 24-page booklet gives the physical characteristics of a variety of castable refractories. Described within is a full range of products for use in furnaces with temperature ranges from 700°-3500° F. Data on their use is also included. (Kaiser Aluminum & Chemical Corp.)

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Motorized Spindles

Complete specifications on a new and comprehensive line of high-precision motorized spindles are given in a 2 - color bulletin. The spindles limit vibration amplitude to 25 millionths of an in., and shaft runout to 75 millionths. (Pope Machinery Corp.)

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Fights Corrosion

An attractive green and white folder explains a simple, but effective, low - cost anti - corrosion treatment for bare metal, plated and painted surfaces. Photomicrographs show how corrosion occurs, and how the new formulation fights it. (Corrosion Reaction Consultants)

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Cut-Off Wheels

Designed to make the selection of cut-off wheels as easy as possible, a 2-color bulletin suggests specifications for particular applications. Several hints on proper operation also benefit the user. The wheels themselves are manufactured of aluminum oxide and silicone carbide in various grain sizes and combinations to suit different situations. (Simonds-Worden-White Co.)

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Tests Insulation

This new publication illustrates and describes improved models in a popular line of insulation testers. The instruments are in the 500- and 1000-v class with extended sensitivities up to 10,000 megohms in the 100-v unit. The bulletin fully explains all operating characteristics and suggests unusual uses for the instruments. (James G. Biddle Co.)

For free copy circle No. 15 on postcard

Threaded Fasteners

Expressing the company's philosophy, a new brochure also illustrates samples from a complete line of threaded fasteners for airframe, electronic and general-industry projects. These fasteners are available in stainless steel, alloy steel, carbon steel and other materials. (Fairco Industries)

For free copy circle No. 16 on postcard

Dresses Wheels

The subject of a 6-page folder is a new attachment that dresses grinding wheels. The unit mounts on practically any standard grinding machine. It uses a microscope to ensure a perfect blend between radii and angles in forming the wheel. (Parker-Hartford Corp.)

For free copy circle No. 17 on postcard

Tank Heaters

This 8-page bulletin illustrates and describes a line of vertical- and horizontal-tank heaters. In addition, there's complete rating data for all sizes of tanks and for all types of duties. (The Griscom-Russell Co.)

For free copy circle No. 18 on postcard

New Roebling Wide Width Tempered Spring Steel makes the most of a good thing

. . . (your money, for instance!)

You count your profits in the number of holes in your scrap. And spring steel that doesn't measure up to the most good parts per inch just isn't the right steel for you.

That's why everybody's talking about new Roebling tempered, cold rolled spring steel. Comes in *any* width up to a full handspan wide. 8⅝ inches, that is, by .005 to .062 inches thick. Think how useful that unique extra width can be in getting extra blanks from a length of steel! The thickness is consistent, too.

Now pick a finish – any finish – blued, straw, or bright – plain or ground, Roebling's got it. Buy Roebling Cold Rolled Spring Steel and you get uniform excellence in temper and finish. Delivery? No problem at all. Get full facts and figures by writing Roebling's Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey.

ROEBLING

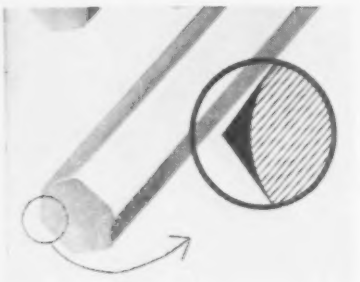
Branch Offices in Principal Cities
John A. Roebling's Sons Division
The Colorado Fuel and Iron Corporation

New Materials and Components

Single-Stage Turbine Pump Develops High Heads

Designed for high-head, low-capacity use, a turbine pump operates on an unusual principle—pressure regeneration. Here's what happens. A multi-vaned impellor engages and re-engages the liquid, developing high heads in one stage. This cycle repeats as many as 50 times as pressure builds up in the pump. When the liquid reaches the discharge opening it escapes, but a stripper in the plates stops the flow from continuing on to the suction area. As a result, the pump operates with large amounts of entrained vapor. Vapor binding is no problem. (Worthington Corp.)

For more data circle No. 19 on postcard, p. 119



Round-Corner Hex Rods Curtail Machine Wear

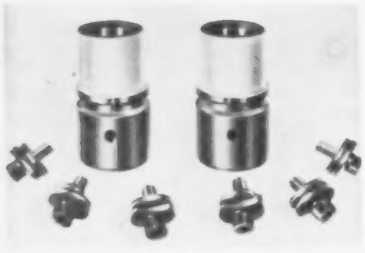
Offering many advantages for screw-machine use, new round-cornered hexagon rod is priced the same as standard-hex stock. Free-cutting brass, commercial bronze and naval brass come in the new form. How is it better? First, there's a direct saving of 0.005 pct in metal weight for a given length of rod. This adds up on long runs. Since the rounded corners are less subject to nicking and burring, the rod feeds more smoothly into the screw machine. Thus, there's less wear on feed fingers and tools. Users report more output with less machine downtime. (Scovill Mfg. Co.)

For more data circle No. 20 on postcard, p. 119

Synthetic Latex Controls Corrosion and Rust

When corrosive chemicals penetrate paint and attack the metal beneath, the primer has a tough job. It must ward off these chemical reactions and prevent damaging rust. Anyone, who has seen his automobile rust, knows that present metal primers don't always fill the bill. But here's a new synthetic latex that shows great promise for corrosion control. It's applied just like paint. Air dries it. Despite this ease of application, tests show the new latex has excellent resistance to water and salt spray. Metals coated with the primer show no traces of rust—even after 100 hr of continuous exposure to salt spray. Water immersion tests show equally good results. Another advantage of the material is its strong adherence to steel. (Goodyear Tire & Rubber Co.)

For more data circle No. 21 on postcard, p. 119



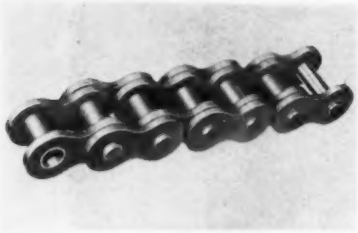
Bushings Aid Electric-Discharge Forming Of Dies

These insulated bushings allow mounted dies to be machined by the electric-discharge method. It's done by using the bushings in a die set, and mounting an expendable punch or copper electrode directly in the production punch. This process is much faster than the old way —machining before mounting the die. The bushings have an insulated contact surface and insulated clamps. They withstand an electrical potential that exceeds 1100 v. This gives a margin of safety. (Danly Machine Specialties, Inc.)

For more data circle No. 22 on postcard, p. 119

Strong Roller Chain

Recommended for use on hardened sprockets, a long-wearing chain features fewer wearing surfaces. Its new design leaves only three wearing surfaces, as compared to the previous five. In addition, there are only four wearing parts per block link—two pins and two fixed-bearing members. By combining the bushing and roller into the one fixed-bearing member, additional space is available for the pin. As might be expected, the larger

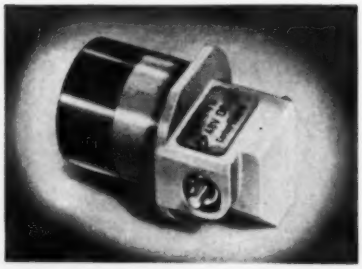


pin offers two-thirds more shear strength. The result of these design improvements is extended-service life. (The Jeffrey Mfg. Co.)

For more data circle No. 23 on postcard, p. 119

Miniature Gearmotor

This new miniature gearmotor is a permanent-magnet type for operation on direct current. Six models are offered for input voltages of 6, 12, 24, 28, 32, or 48 v dc. The double gear reduction permits output shaft speeds of 10-100 rpm,



with a maximum torque of 50 oz-in. Overall size is 2¾ x 2 in.; weight 9 oz. (Carter Motor Co.)

For more data circle No. 24 on postcard, p. 119

Seals Around Corners

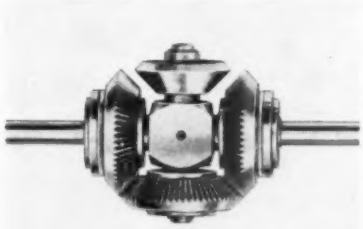
Two new extruded rubber-base sealers, with a unique double-donut cross section, permit positive sealing of uneven or tapered joints. They'll also takes a 90° bend. You don't need to do any cutting or fitting. The sealers act and perform like a rubbery gasket when pressed into a

seam and tightened between mating metal surfaces. Both have excellent moisture, salt-spray and weathering resistance. One sealer is hollow. This permits greater compression in uneven seams. The other is solid for better void-filling characteristics in wide seams. (Minnesota Mining & Mfg. Co., Adhesives Coatings & Sealers Div.)

For more data circle No. 25 on postcard, p. 119

Instrument Differential

For computers and control instruments of all kinds, a new line of precision differentials provide clearance circles down to ½ in., or less.



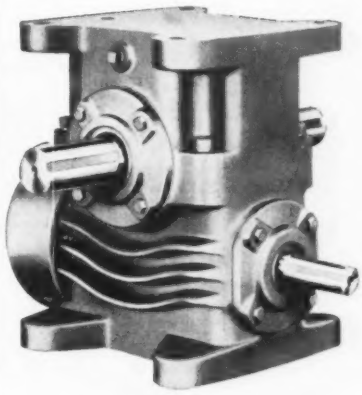
Thus, they're particularly valuable where space is limited. Except when aluminum spider gears are specified, the differentials are entirely stainless steel. Each unit employs six miniature ball bearings. As for performance, the newcomers hold backlash to 8 minutes, or less as required. Break-away torque is from 0.1-0.3 oz-in., depending on size. In addition, the units maintain balance at all times. (Instru-Lec Corp.)

For more data circle No. 26 on postcard, p. 119

Measures Torque

For production tests to evaluate hot-fluid hydraulic pumps, a torquemeter boasts the inherent strength needed to support the pump. Pad-type couplings, in accordance with AND standard specifications, sup-

A Morse answer



Eberhardt-Denver

poweRgear®

...when the problem involves heavy duty and reliability

High horsepower capacity
Oversize shafts
Extra-large bearings
Heavy-duty gearing
Universal mounting
All types available
Fractional to 53 hp. loads
Ratios 5:1 to 3600:1
Center distances 2″ to 7″
Distributor-stocked

Got a speed-reducer problem? Call your Morse distributor in the Yellow Pages.

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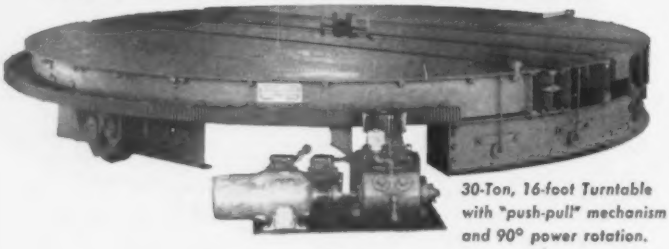
for turnaround convenience

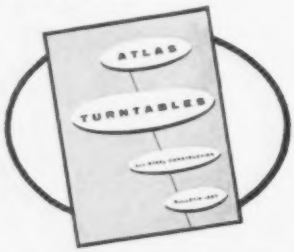
ATLAS turntables



30-Ton, 16-foot Turntable with "push-pull" mechanism and 90° power rotation.

Atlas turntables are made to customer specifications in any size and capacity; for manual or power rotation. Either flush or raised rail arrangement can be provided, with rail size and gauge to match existing track.

Request



Bulletin 1297

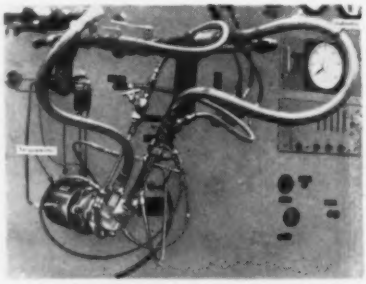
Since 1896 . . . Engineers-Builders of Ore Transfers . . . Scale Cars . . . Coke Quenchers . . . Coal Larries . . . Door Machines . . . Safety-Type Transfers . . . Storage Battery Locomotives

ATLAS CAR & MFG. COMPANY

1140 IVANHOE ROAD

CLEVELAND 10, OHIO

ply the proper mating characteristics on the drive end. For high-temperature operation, all components withstand 500°F. On the brushes, 700°F solder is used. Standard models cover torque ranges from 1.0 in.-lb, full scale, to 30,000 in.-



lb. full scale, and speed ranges up to 50,000 rpm. (B & F Instruments, Inc.)

For more data circle No. 27 on postcard, p. 119

Miniature Fasteners

Here's a quick-operating fastener that does the job where space and weight limitations are important factors. It offers these advantages: Inside projection—less than ⅛ in.; thin oval head; locks instantly with ¼ turn; unlocks the same way. In addition, there are no special holes to make and no special tools to buy.

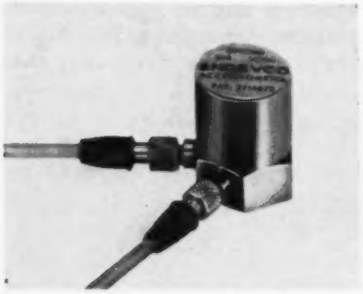
Simply fit the hardened steel stud into its stainless steel receptacle. (Simmons Fastener Corp.)

For more data circle No. 28 on postcard, p. 119

In-Place Accelerometer

A new, high-temperature accelerometer provides for in-place calibration of a telemetry system. A precision resistor is sealed in the base of the unit, so that a known current will simulate a specified

gravitational force. The charge that's developed at the accelerometer is proportional to the unit's

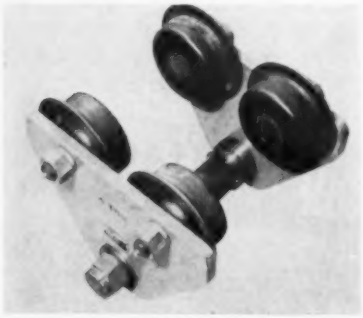


sensitivity. Thus, you can check out the system with the equipment in place. The accelerometer features all-welded, hermetic construction, incorporating a special thermal shield to permit operation for four minutes with nearby surface temperatures of 750°F. (Endevco Corp.)

For more data circle No. 29 on postcard, p. 119

Four-Ton Trolley

Rated at four tons, this chain-hoist trolley fills the need for a con-

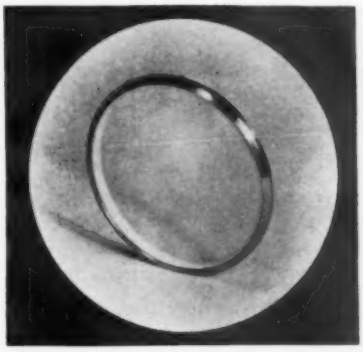


veyor trolley with high capacity and a flat tread for use on wide-flanged H-beams. Heavy-reinforced side plates extend past the wheels. They act as bumpers. Since the side plates are self aligning, they also assure equal-load distribution. Both halves of the trolley are adjustable. Thus, you can mount the unit on any point of the H-beam. Spacing washers permit exact adjustment on beams from 3-18 in. (Saginaw Products Corp.)

For more data circle No. 30 on postcard, p. 119

Teflon-Stainless Seal

This composite seal operates at temperatures from —65°F to 600°F. Its outer ring, made of high-strength stainless steel, maintains the seal under pressures up to 10,000 psi. The Teflon primary seal, permanently joined to the metal component, provides a soft seat for completely leak-tight sealing. But, that's not all. The unit is highly resistant to corrosion. And, it's compatable with nearly all fluids. Since Teflon eliminates cure dates, the



service and stock-control problem is simplified. Furthermore, the units are reusable. (Pall Corp.)

For more data circle No. 31 on postcard, p. 119

Indexing Table

A rugged new cam- and roller-drive index table comes in several sizes and a selection of stations. It features a large, non-rotating center. This center comes completely designed to customer requirements. Interchangeable cams vary the ratio of dwell time to travel time. Another feature of the center is the fact it can be tooled to mount auxilliary units for drilling,

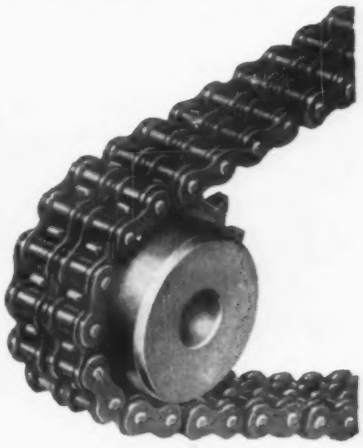
tapping, staking, clamping, ejection and inspection operations. (Edward Segal)

For more data circle No. 32 on postcard, p. 119

Valve Feeders

A complete line of cast-iron, rotary-vane feeder valves and air-

A Morse answer



roller chain

...when the problem involves service life and performance

Superior fatigue resistance

Increased horsepower ratings

Statistical hardness control

Electronically controlled pitch

All parts automatically inspected

Drive-design service

Distributor-stocked

Got a chain problem? Call your Morse distributor. He's listed in the Yellow Pages.

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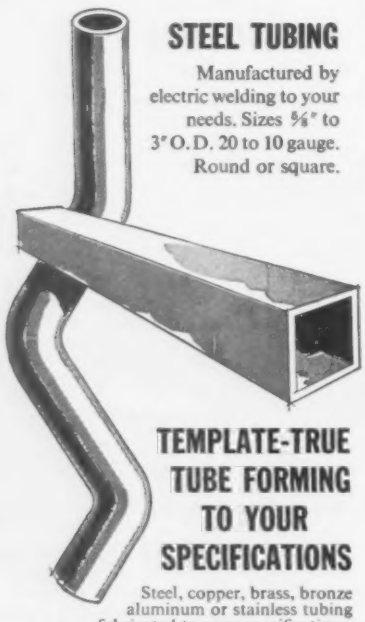
TWO
FORMED
TUBES
PLANTS
to serve you

1. Sturgis, Michigan
In heart of metal working industry.
Seven large truck line terminals.
New York Central and
Pennsylvania Railroads.

2. Haleyville, Alabama
Convenient to Birmingham.
On U. S. Highway 278.
Southern and Illinois Central Railroads.

STEEL TUBING
Manufactured by electric welding to your needs. Sizes ⅝" to 3" O.D. 20 to 10 gauge. Round or square.



TEMPLATE-TRUE TUBE FORMING TO YOUR SPECIFICATIONS
Steel, copper, brass, bronze aluminum or stainless tubing fabricated to your specifications. Sizes ⅝" to 6" OD, 20 to 10 gauge.
Thirty-four years of experience in forming, welding, beading, bending, stamping of formed tubes.
Top-flight engineering service.
Write, wire or phone for booklet or quotation.
Formed Tubes, Inc.
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Formed Tubes, INC.

DESIGN DIGEST

locks boast high-quality construction at savings up to 40 pct. These feeder valves have cast-iron housings and fabricated-steel rotors. They're also available with cast-stainless, aluminum and iron-alloy

bodies. Rotors can be furnished in aluminum, stainless steel and other special materials. (The Young Machinery Co.)

For more data circle No. 33 on postcard, p. 119

Mold Release Lubricant

A dry-mold release agent and lubricant of unusual properties sprays on parts and materials as an easily-identified color coating. Its base is a recently-perfected fluorocarbon dispersion that performs effectively at temperatures up to 500°F. It forms slick coatings that won't pick up dirt, run, stain or dissolve in common solvents. Because of the color base, you can distinguish between coated and non-coated areas. This helps improve application efficiency. The agent is particularly recommended as a mold release for electronic potting and encapsulating or injection and compression molding of phenolic and epoxy resins. It's also good as a general release agent and lubricant for plastics and metal products. (Miller-Stephenson Chemical Co., Inc.)

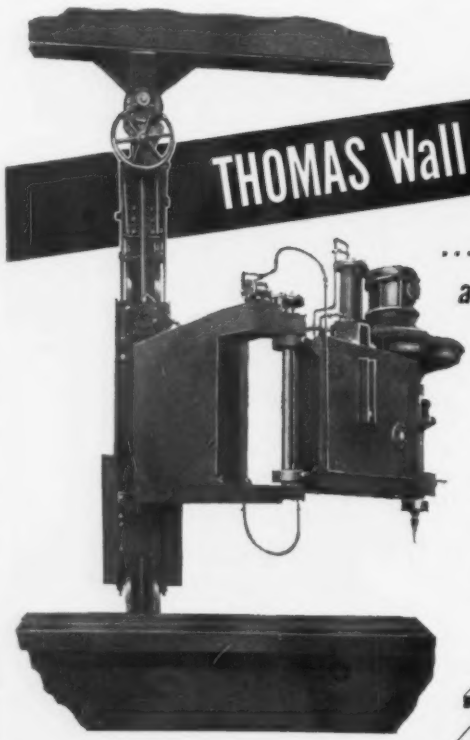
For more data circle No. 34 on postcard, p. 119

Magnets Feed Presses

Designed and engineered for handling blanks, stampings or formed-steel parts, new press-feeding magnets do just that — with no moving parts. But, a fixed cam

THOMAS Wall Radial Drill

... for drilling plates, angles and beam flanges too heavy to punch



THIS new Thomas tool is a "must" for every structural fabricator who depends on production drilling. It's the Thomas Wall Radial, column-mounted... the handiest and most rugged tool of its kind you ever used!

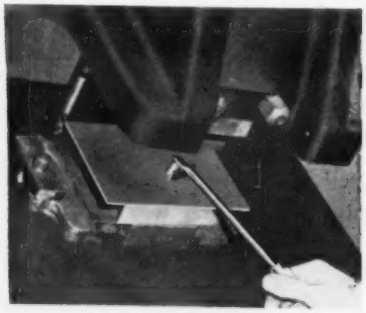
Ask for Bulletin 320 now!

THOMAS
MACHINE MANUFACTURING COMPANY
PITTSBURGH 33, PA.

the trend is to THOMAS
in Punches • Shears • Presses • Spacing Tables • Benders

60

plate allows magnetic contact to be broken, while holding the steel in place. Incidently there's an indefinite guarantee on magnetic strength. The absence of moving parts and rugged construction en-

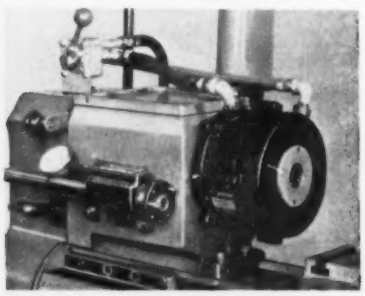


sure long and dependable service life with increased production and safety. (Magni-Power Co.)

For more data circle No. 35 on postcard, p. 119

Collet Actuater

Instant closing and releasing of flexible-rubber collet chucks, without stopping the spindle, is now possible with this new collet actuater. The complete unit, including the actuater cylinder, spindle sleeve and nose piece threads into any 2½ in. x 8 threaded lathe spindle without machine alterations. It produces a grip 22 times greater than air-line pressure with a ¼-in. stroke. On



fast hand operations such as deburring and polishing, savings in chucking time upgrade production as much as 400 pct. (Wil-Numat Corp.)

For more data circle No. 36 on postcard, p. 119

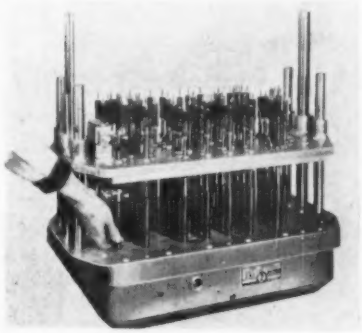
Titanium Alloy

Now all the economic advantages of powder-metallurgy processing are available without sacrificing the strength, light weight, corrosion resistance and low thermal expansion normally associated with titanium. A new sintered titanium alloy has an excellent balance between tensile strength (119,000 psi), ductility (6 percent elongation) and hardness (RC 23). Strengths as high as 146,000 psi result from heat treatment. Just as important, a wide range of finished components can be made from this alloy on a volume basis. (Clevite Corp., Mechanical Research Div.)

For more data circle No. 37 on postcard, p. 119

Spindle-Lead Screws

Individual spindle-lead screws on a line of drilling-tapping heads increase their versatility. Simultaneous tapping of holes with 5/16-in. cen-



ters is possible. The screws operate on the same close centers as the spindles to which they are attached. Standard screws allow Class 3 threads to be tapped consistently in all materials. However, individual lead-screw tappers are still available. (Zagar, Inc.)

For more data circle No. 38 on postcard, p. 119

Vinyl Stabilizers

Two, new, single-package vinyl stabilizers provide improved stability, color and stain resistance. The products are cadmium-barium-zinc liquids to stabilize polyvinyl chlorides for better calandering, molding and extruding formulations. They provide good balance between initial color and long-term stability, plus sulfur-stain resistance. Both products are light yellow in color. Specific gravities are 1.02 for one, 1.01 for the other. (Metasap Div., Nopco Chemical Co.)

For more data circle No. 39 on postcard, p. 119

A Morse answer

Morflex couplings

...when the problem involves vibration and misalignment

Isolate vibration

Cushion shock

Absorb misalignment

Torsionally flexible

Impervious to water, dirt, oil

Arrest electrolysis

Distributor-stocked

Got a coupling problem? Call your Morse distributor. He's listed in the Yellow Pages.

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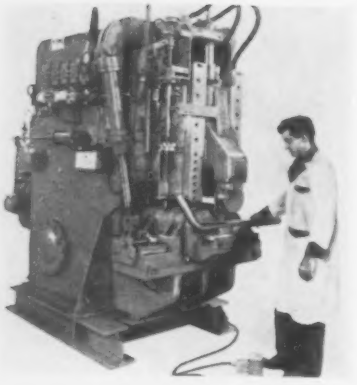
Morse Chain Co., Dept. 33-51, Ithaca, N.Y. Export Sales: Borg-Warner International, Chicago 3, Ill. In Canada: Morse Chain of Canada, Ltd., Simcoe, Ont.

New Equipment and Machinery

Portable Arc Welder Handles Heavy-Duty Jobs

Here's a 125-amp, fully-portable arc welder that weighs only 45 lb. Despite its small size, the unit has ample capacity for any industrial maintenance or utility job. It's versatile as well. For instance, it welds anything from sheet metal to ½-in. plate. No special electrodes are required. The welding range is from 25-125 amp in 12 heat stages. Since the welder operates from any 115-230 v ac line, it fits in anywhere. For easy arc starting, there's a 75-v open circuit. The unit comes complete and ready to weld — with cables, electrode holder and helmet. (Bren/Weld Sales, Inc.)

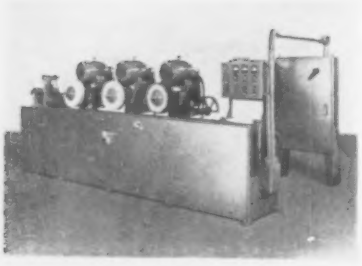
For more data circle No. 40 on postcard, p. 119



Large Presses Speed Progressive Tube Bending

Two new bending presses raise output and reduce costs on tube-bending jobs. One has a 30-ton capacity; the other handles 40 tons. Both boast the ability to up production speeds 3 or 4 times over conventional methods. Smooth bends are produced by the smaller model on work up to 3-in. OD x 0.125-in. The 40-ton press bends work up to 4-in. OD x 0.083-in. In addition, the machines generate enough force to handle laminated tubing or heavy-wall boiler tubing, at speeds up to 800 bends per hr. Behind this performance are some interesting design features. First of all, offset rams and wing die holders provide wide working clearances. Also, the ram speed automatically doubles when the work needs less than half the maximum bending force. (Pines Engineering Co., Inc.)

For more data circle No. 41 on postcard, p. 119



Versatile Machine Tests Production Methods

Want to know ideal production speeds, work pressures and feed rates for polishing and buffing operations in advance of actual production runs? This friction-free comparator machine provides that information. It also tests work wheels, horsepower usage, buffing and polishing compounds, and production parts or materials to make sure they meet standard specifications. Since there's no friction drag, panel readings are exact. (Murray-Way Corp.)

For more data circle No. 42 on postcard, p. 119

Strain-Gage Tests Aid Vibration Machine Design

Now, strain-gage testing aids one company in the design and construction of all its vibrating equipment. Design is no longer based on theoretical formulas, but on fundamental data derived from stress measurements. According to the manufacturer, the answer to rugged construction does not lie in adding weight to gain strength. Adequate design results when all structural members are proportioned for strength, without undue weight. The company claims this procedure gives their line of vibrating machinery exceptional balance, economy and long life. (Hewitt-Robins, Inc.)

For more data circle No. 43 on postcard, p. 119

Strapping Tools

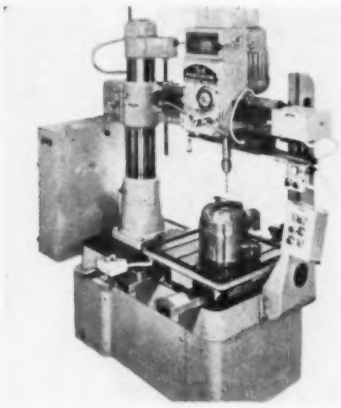
Three air-powered tools tension and seal heavy-duty strapping. High-grade tool steel in the newcomers' sealing jaws means long life and low maintenance. Field tests prove that seal after seal has uniform, high, joint strength. There's built-in ver-

satility, too. The entire sealing assembly rotates relative to the handles to facilitate using the tool on vertical, side or top strapping. (Stanley Steel Strapping, a div. of The Stanley Works)

For more data circle No. 44 on postcard, p. 119

Precision Driller

Low-cost automatic drilling is a reality with the three models of this new drilling machine. They are available with semi-automatic or numerical control. Measuring bars,



servo-micrometers and position indicators are all conveniently located in front of the operator. The basis of the measuring system is an isometric bar, calibrated to 10-millionths of an inch accuracy. Its completely independent of the traversing

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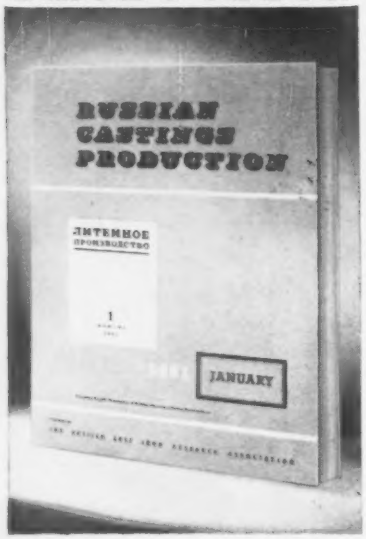
SPOTLIGHT ON
RUSSIAN
CASTINGS
PRODUCTION



Cover to cover translation of Liteinoe Proizvodstvo

Liteinoe Proizvodstvo is the leading Russian periodical devoted to the foundry industry. It deals with all aspects of iron, steel and nonferrous castings production in Russia, from raw materials to finished products, including their behavior. As a service to the foundry industry on both sides of the Atlantic, the British Cast Iron Research Association is publishing a cover to cover translation of this important journal each month. If you wish to keep up to date on current Russian practice—and their fresh approach to day-to-day problems, new techniques and metallurgical investigations are of interest to every go-ahead foundryman—a year's subscription is a worthwhile investment.

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- High-capacity cupola blowers
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- Cupola operation with natural gas partly replacing coke
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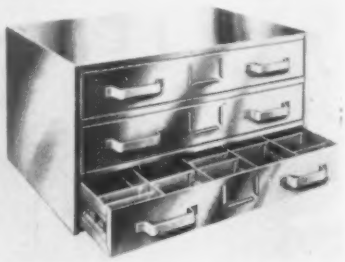
NEW EQUIPMENT

mechanism, ball screws and drive motors. Couple this system with the inherent rigidity of short-column design and you have an accurate assembly, surprisingly low in cost. (Veet Industries).

For more data circle No. 45 on postcard, p. 119

Stores Small Parts

This heavy-duty cabinet stores very-small carburetor and ignition



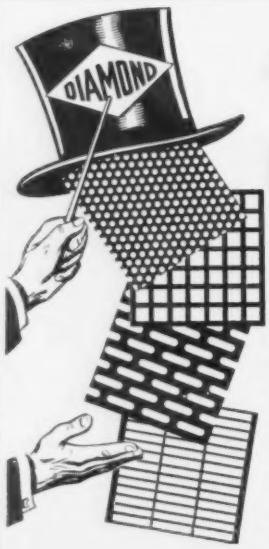
parts, screws, washers, springs and other tiny components. Each of the three drawers has five compartments, 3-in. wide by 11-in. long. These, in turn, are subdivided with cross pieces adjustable on 1-in. centers. This means you can match the compartment size to the part being stored. Since each drawer and cross-divider has an individual index card, the parts are easy to find. The cabinet itself is all steel, finished in gray baked enamel. (Bay Products Inc.)

For more data circle No. 46 on postcard, p. 119

Hydraulic Press Brake

A fully-automated, 500-ton, hydraulic-press brake aids research into new high- and low-temperature metal-forming techniques. These techniques and processes are important in adapting high-strength, heat-resistant superalloys and refractory metals to advanced air and space craft. To accomplish the job, precise control over the variables that affect forming is necessary. And, the press controls do this by governing times, temperatures, pressures and forming speeds. (Pacific Industrial Mfg. Co.)

For more data circle No. 47 on postcard, p. 119



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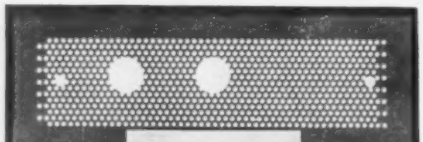

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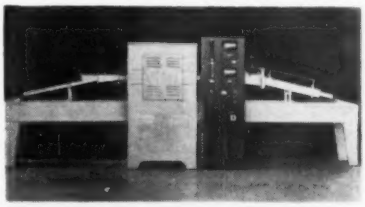
Future plant expansion and subsequent equipment relocation are among the many factors that in-

fluence modern industrial planning. For easy, efficient, equipment placement that will aid relocation, these vibration - isolating pads eliminate expensive floor bolting and cut potential relocation time and costs. The oil-resistant Neoprene pads also lower noise and vibration, reduce wear and tear on equipment, employees and the building. The amount of pad needed for a particular application is calculated by first picking a standard loading. For instance, 50 psi is a typical loading for a 24-ton press. By determining the weight on each support area, you can then determine just how much pad area you need under that support. (Isomode Div., MB Electronics, a div. of Textron Electronics, Inc.)

For more data circle No. 48 on postcard, p. 119

Critical Brazing

This hydrogen furnace solved a critical brazing problem. The actual brazing operation involves a selective reduction of oxides to establish precise percentages and proper flow of the bonding material to an exact point. The principle objective



in the furnace design is to minimize gases and impurities, and eliminate structural strains and distortion. En-

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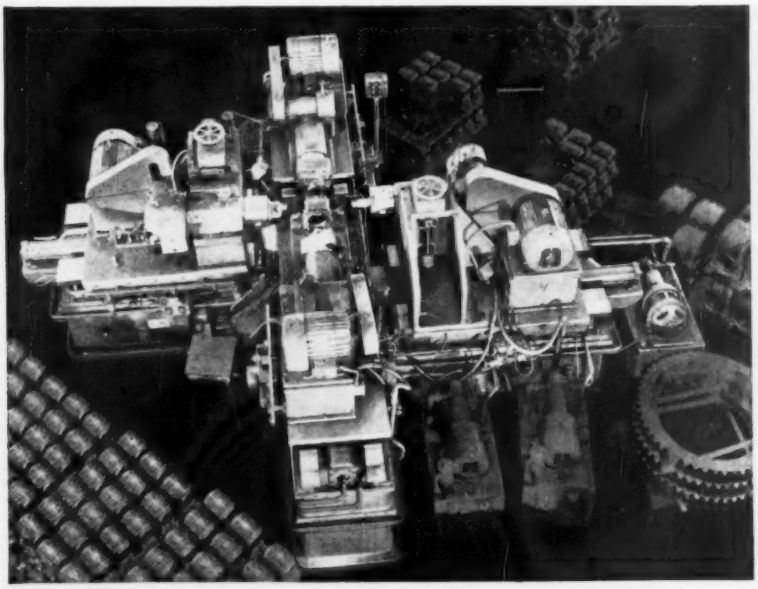

This pays off years from now!

Long life and low maintenance costs in a speed reducer are direct results of original accuracy and quality. Cone-Drive speed reducer housings are machined on this special 4-way boring machine to "tenths", assuring exact alignment of the **double-enveloping worm** and gear used.

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gineers answered these requirements with an elevated heating chamber that has inclined loading and unloading sections. The inclined loading section insures positive flushing and purging as a result of a counter-flow action from the hydrogen atmosphere washing over the incoming parts. This action outgasses each part before it enters the heating chamber. (C. I. Hayes, Inc.)

For more data circle No. 49 on postcard, p. 119

Post-Heating Machines

These post-heating machines step up production and quality of die-cast aluminum rotors for electric motors. In some instances, the heat imparted to the rotors also shrink fits the shafts and rotors. Stray filaments of aluminum, forced between the steel laminations of the rotors during die casting, tend to reduce motor efficiency. These are broken up by post heating. This heating imparts a differential expansion between the steel laminations and the die-cast metal. Thus, there's a

tendency to shear off and round off the stray portions of the aluminum conductor bars that have been forced between the steel laminations. (Selas Corp. of America)

For more data circle No. 50 on postcard, p. 119

Improved Grinder

Advanced safety devices plus convenient handling of odd-shaped stock are features of an improved 7-in. grinder. For instance, safety shields with shatter-proof glass guard the operator's eyes. Inside the shields, bayonet-type bulbs have shades to prevent glare. But, they

still illuminate the face and both sides of the wheel. For odd-shaped and long stock, maximum clearance has been built into the grinder. It's available in bench and pedestal models. (Walker-Turner Div., Rockwell Mfg. Co.)

For more data circle No. 51 on postcard, p. 119

COST-CUTTER

The *only* accurate way to measure your abrasive costs is to determine *cost per ton of castings cleaned—not* just the cost of abrasive.

Rotoblast Steel Shot and Grit clean castings at lower cost per ton than other abrasives. That is why Rotoblast Steel Abrasives are the fastest growing on the market today. *Sales volume has tripled in 3 years!*

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Pangborn
OF HAGERSTOWN

Recovery Follows Orderly Path

The pickup in steel demand continues to show moderate-but-steady gains for May and June.

And the usual summer slump in July could be less pronounced than in other years.

■ The recovery in steel demand is still moving in a remarkably uniform manner. It is orderly, moderate, and broad.

A survey by IRON AGE District Editors discloses that:

1. The steel improvement is no flash-in-the-pan.

2. The summer slowup is coming, but it may be only a leveling-off instead of a letdown.

3. Seasonal factors have come from one-to-two months late this year. Thus, they will hold over longer than usual.

4. There are some signs that consumers are ordering a little further ahead—a pattern of past recoveries, which feeds on itself.

5. An operating rate of 65 pct (of industry steelmaking capacity) or slightly higher is assured for the second quarter. While a high of around 70 to 75 pct cannot be sustained throughout the summer, it will probably reappear after Labor Day.

6. If oil and gas, railroads, home construction, appliance makers, and miscellaneous users all move into the market together later, a minor boom in steel could get underway in the latter part of the year.

Automakers Plans—Heavy shipments of automotive steel the past few weeks are having an effect on mill deliveries. Automakers plan to have most of the steel they need for the remainder of 1961 model production on hand by mid-June.

But they will start getting steel for 1962 model production even before then. Auto sales executives are convinced the next model year will be strong, and the industry is planning that way.

Steel mills are moving into the critical period for June. If orders come in as they did in late April, operations could reach 75 pct next month.

Watch Out for June—According to one mill, May demand has only been met by using inventories of semi-processed stocks. If there is another surge of late tonnage orders, some customers could be caught short in June.

And if June does bring a decisive gain, it could give demand the continuity that has been missing so far. Except for galvanized and tinplate, the recovery has brought only a minor stretchout of lead times. But day-to-day buyers are finding it harder and harder to get quick delivery on steel.

Summer Slowdown — The momentum of the uptrend can be expected to carry into July before summer factors will become effective. Shipments normally drop about 15 pct in the month. But the size of the drop could be more moderate this year.

Construction is just beginning to get moving. While it is still far from being a tidal wave, the gain is noticed in a wide range of products from structurals to wire.

Not Too Worried—And automakers aren't too worried over the possibility of a strike at the end of the summer before a new labor contract is signed.

They intend to have enough steel on hand for a fast start on 1962 model production when the time comes. And they would use a strike period to clean up 1961 model inventories, which are being built-up.

District Steel Production Index 1957-59=100

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	108	105	103	112
Buffalo	118	120	100	108
Pittsburgh	93	92	90	107
Youngstown	98	96	84	80
Cleveland	123	124	105	126
Detroit	134	128	113	135
Chicago	113	106	102	109
Cincinnati	116	115	103	116
St. Louis	122	114	113	106
Southern	104	106	94	108
Western	128	127	121	112
U. S. Index	109.3	106.7	99.7	109.0

Source: American Iron & Steel Institute

Steel Production, Composite Prices

Production	Last Week	Two Weeks Ago	To Date 1961	To Date 1960
(Net tons, 000 Omitted)	2,370	1,988	33,012	50,010
Ingot Index				
(1957-59=100)	109.3	106.7	88.6	134.2
Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel base (Cents per lb)	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.44	$66.44	$66.44	$66.41
Scrap No. 1 hvy (Gross ton)	$36.50	$36.50	$37.50	$32.50
No. 2 bundles	$24.17	$24.17	$25.17	$22.17

Modern Buying Termed a Science

New book stresses procurement as a function of management. Author-professor points the way to more scientific buying.

PA's role is growing in areas before and after order issuance.

■ Buying, purchasing, and procurement do not mean the same thing. This is one point made in a new book by Miami Univ. (Fla.) professor of management, Dr. Henry G. Hodges. Book title: Procurement. (Harper, 399 pp., $7.50).

The point is an important one, according to Dr. Hodges. An understanding is essential if PA's are to recognize their new role in industry.

"Buying," writes Dr. Hodges, "refers to the simple exchange of a commodity or thing for an agreed price. Purchasing refers primarily to negotiation, purchase, and payment.

Procurement — "Procurement," continues the professor, "is a more recent and inclusive concept. As the science of management developed, many important steps were added to purchasing, both before and after the issuance of an order to a supplier. From the systemization of these before and after steps, emerged a new scientific procedure known as procurement."

In the book, Dr. Hodges covers standard text book areas such as purchasing organization, order quantity and quality factors, budgets, and storekeeping. But he stresses the newer elements of purchasing that enlarge its dimensions. Some of the ground covered includes make or buy, value analysis, leasing, and purchase research.

A feature of the book that adapts it to use by purchasing groups or classroom discussions is the case problem approach. At the end of each of the 27 chapters, Dr. Hodges spells out an actual problem relating to the chapter subject. These problems call for more than black and white answers. They are judgment problems in many cases where experience, as well as reading, will help form decisions.

Little Math — Some purchasing men may be disappointed that Dr. Hodges doesn't explore and explain in detail the mathematical or formula approaches that are moving into buying. But he does identify the elements that must be weighed in leasing decisions, make or buy analyses, and other growing concerns of purchasing management. The book is not a technical one.

Of singular value to many PA readers will be the chapter on departmental manuals and controls. Here, Dr. Hodges has clearly shown how PAs' can streamline and simplify office operations through use of process charts. This is an amply illustrated part of the book. And it gives purchasing men in any size company a simple, effective and handy tool to cut down crushing piles of paperwork and tedious clerical routines.

Creative Buying—These routines and details have too often buried the best efforts of otherwise top purchasing men, according to the author. This diversion of time and energy has kept many PAs' from doing a creative procurement job.

Says Dr. Hodges: "Procurement has only recently become an important and correlated function of management."

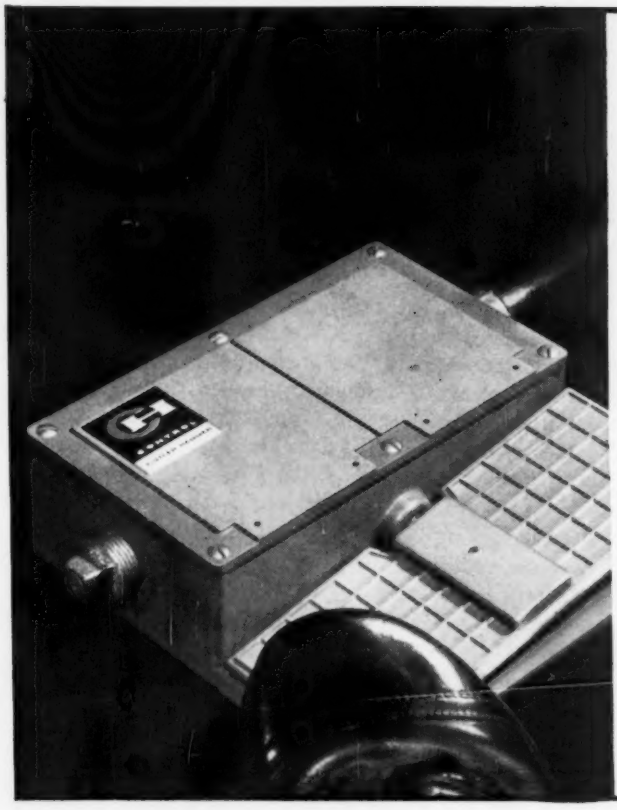
He has designed his book to aid purchasing men in their efforts toward more scientific control of this management function called procurement.

In his book, Dr. Hodges does not see the modern purchasing man as a buyer only. Neither does he see him as a materials manager.

Purchasing's New Look . . .

Purchasing is no longer singularly concerned with issuance of orders to suppliers. Says Dr. Henry G. Hodges: "Today, with the systemization of before-order and after-order steps, a new scientific procedure has emerged. This is known as procurement. What has been added to the original purchasing activities can be summed up in the following scheme:"

Before Order	Order	After Order
1. Requisition	1. Negotiation	1. Follow-up
2. Quality	2. Purchase	2. Receiving
3. Quantity	3. Payment	3. Inspection
4. Delivery		4. Storage
5. Vendors		5. Inventory
6. Routing		6. Research



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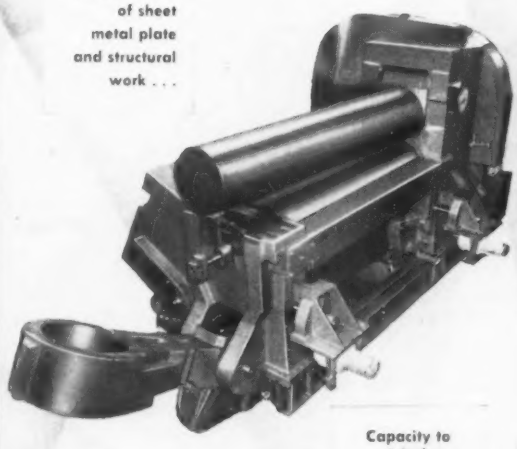

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Delivery Promises Start Moving Out

Mill delivery estimates are beginning to stretch out as steel orders improve.

But the situation varies, depending on the product involved and the market area.

▪ Mill delivery estimates, reacting to an improved market, are starting to lengthen out.

As yet the gains are not great. They vary, depending on the product and the market area involved. (For changes, see table, below.)

In most markets galvanized and tinplate continue in very strong demand. Products such as plate, pipe, wire, and structurals are showing only limited change.

Products Involved—Most of the gains in shipping estimates are for sheet and bar. Greatest advances are coming in the Midwest, with less movement at Pittsburgh and along the East Coast.

In some markets, notably Detroit, a higher level of mill operations has acted to keep delivery promises stable. With more orders coming in, the mills have increased rolling schedules and can fit in more tonnage without difficulty.

Despite the general tightening in deliveries, many buyers are still not hurrying to place orders. Unaware that pressure on mills is growing, they still insist on short delivery. When they can't get it, they settle for what the mills can offer.

Rundown by Markets — Here's how the situation looks by market areas:

Along the West Coast, delivery estimates on sheet and plate have moved out about a week. At Chicago, sheet products have advanced two weeks. Gains of one week are reported for bar, plate, structurals, wire, and pipe.

Pittsburgh mills note gains of about a week for sheet, strip, and bar items. On the East Coast, sheet and strip deliveries have extended about a week.

Sheet and Strip — Demand for galvanized sheet continues to pace the market. Many mills are booked well into July. Auto industry orders are helping this market. In addition, some buyers may be adding extra tonnage to orders as a hedge against possible shortages.

On other sheet products, there's less urgency. A **Pittsburgh** mill says June cold-rolled orders were running behind May until automotive buying gave them a push. However, **Chicago** area mills are moving at strong levels.

Plates and Shapes — Along the **East Coast,** demand is still only fair. Construction has not given the market as much boost as expected. **Pittsburgh** buyers can still get one week delivery on structurals. Light plate is also readily available. Further west, the picture is a little brighter. Structural steel volume is picking up in **Detroit.** Both plates and shapes are gaining at **Chicago,** with mills operating at high rolling rates.

Pipe and Tubing — Despite a slight increase in demand, pipe products are still usually available right out of stock. Makers of oil country seamless report May orders are disappointing. Oil producers are still buying on a day-to-day basis from downriver stocks.

Service Centers—Products in the greatest demand by service center customers are bar, galvanized sheet, plates, cold-rolled sheet and alloy steels. That's the report of the Steel Service Center Institute. Attracting the least interest, the Institute notes, are heavy structurals, cold-finished bar, and tubing. The warehouses term their customers' inventories "mildly insufficient" based on present operating rates.

Inventories in members' warehouses, as of May 1, were estimated at 2.9 million tons. This was 50,000 tons above the April 1 level. Peak level was hit last summer at 3.8 million tons, the highest in history.

Delivery Promises at a Glance

	East	Pittsburgh	Cleveland	Detroit	Chicago	West Coast
CR Carbon Sheet	3-5 wks	3-5 wks	2-4 wks	3-6 wks	4-6 wks	5-6 wks
HR Carbon Sheet	2-5 wks	3-4 wks	1-3 wks	2-5 wks	4-5 wks	5-6 wks
CR Carbon Strip	3-5 wks	4-5 wks	2-4 wks	3-6 wks	4-6 wks	4 wks
HR Carbon Strip	2-5 wks	3-4 wks	1-3 wks	2-5 wks	3-5 wks	5 wks
HR Carbon Bars	2-4 wks	2-3 wks	1-4 wks	1-6 wks	2-4 wks	4 wks
CF Carbon Bars	2-4 wks	2-3 wks	Stock–4 wks	Stock–6 wks	3-5 wks	1-2 wks
Heavy Plate	2-3 wks	2-3 wks			2-3 wks	5-6 wks
Light Plate	2-3 wks	1-2 wks	1-3 wks		2-3 wks	5 wks
Merchant Wire	Stock	Stock	Stock		3-4 wks	2 wks
Oil Country Goods	Stock	Stock	Stock		1-3 wks	
Linepipe	Stock	1-4 wks	Stock		3-4 wks	Stock
Buttweld Pipe	Stock	Stock	Stock	Stock	3-4 wks	Stock
Structurals	2-4 wks	1-2 wks	1-4 wks	1-4 wks	4-5 wks	Stock–4 wks
CR Stainless Sheet	Stock–4 wks	Stock–3 wks	Stock–3 wks	Stock–5 wks		
CR Stainless Strip	Stock–4 wks	Stock–3 wks	Stock–3 wks	Stock–5 wks		

COMPARISON OF PRICES

(Effective May 22, 1961)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	May 22 1961	May 15 1961	Apr. 24 1961	May 24 1960
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.10	14.10	14.10	14.10
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tin plates (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchants bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	46.75
Wrought iron bars	14.90	14.90	14.90	14.90
Wires: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 10 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	May 22 1961	May 15 1961	Apr. 24 1961	May 24 1960
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.68	$70.68	$70.68	$70.57
Foundry, South Cin'ti.	71.92	71.92	71.92	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.11	70.11	70.11	70.07
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese 74-76 pct Mn. cents per lb.‡	11.00	11.00	11.00	11.00
Pig Iron Composite: (per gross ton)				
Pig iron	$66.44	$66.44	$66.44	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$34.50	$34.50	$35.50	$33.50
No. 1 steel, Phila. area	39.50	39.50	39.50	34.50
No. 1 steel, Chicago	35.50	35.50	37.50	29.50
No. 1 bundles, Detroit	33.50	33.50	33.50	29.50
Low phos. Youngstown	39.50	39.50	38.50	36.50
No. 1 mach'y cast, Pittsburgh	45.50	45.50	45.50	50.50
No. 1 mach'y cast, Phila.	49.50	49.50	50.50	51.50
No. 1 mach'y cast, Chicago	47.50	47.50	49.50	50.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$36.50	$36.50	$37.50	$32.50
No. 2 bundles	24.17	24.17	25.17	22.17
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	14.75-15.50	14.75-15.50	14.75-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	31.00	30.00	29.00	33.00
Copper, Lake, Conn.	31.00	30.00	29.00	33.00
Tin, Straits, N. Y.	110.625†	110.25**	100.50	99.625
Zinc, East St. Louis	11.50	11.50	11.50	13.00
Lead, St. Louis	11.00	11.00	11.00	11.80
Aluminum, ingot	26.00	26.00	26.00	28.10
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. **Revised.

Finished Steel Composite

Weighted index on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

INDEX TO PRICE PAGES

Prices At a Glance 133
Comparison of Prices 137
Bars 146
Billets, Blooms and Slabs 144
*Boiler Tubes
*Clad Steel
Coke 149
*Electrical Sheets
*Electrodes
*Electroplating Supplies
Fasteners 148
Ferroalloys 150
Iron Ore 148
Merchant Wire Products 148
*Metal Powders
Nonferrous
  Mill Products 143
  Primary Prices 137, 142, 143
  Remelted Metals 143
  Scrap 143
Piling 144
Pig Iron 148
Pipe and Tubing 149
Plates 146
*Rails
*Refractories
Service Center Prices 195
Shapes 144
Sheets 145
*Spring Steel
Stainless 148
Steel Scrap 140
Strip 144
Structurals 144
Tinplate 145
Tool Steel 148
*Track Supplies
Water Pipe Index 149
Wire 146
Wire Rod 145

* Appears in the May 18 - June 1 issues.

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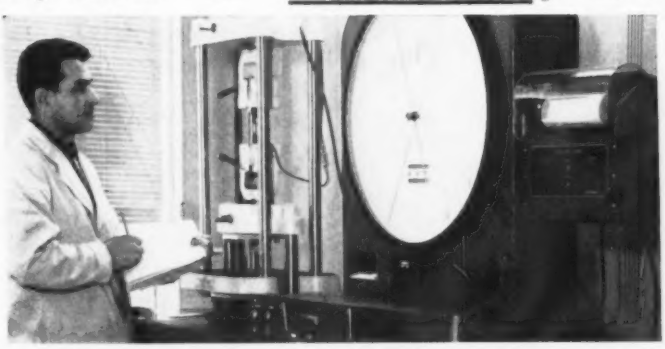

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Market Inches Up Another Notch

The scrap market moved up another notch this week. Many dealers are looking for higher levels in June.

There are only scattered price changes. But these indicate definite firmness.

■ The scrap market inched up another notch this week. And many areas are expecting June to bring an even more dramatic upswing. Dealers throughout the country are generally bullish in anticipation of higher price levels next month.

The big reason for this optimism by scrapmen is still increased steel activity. However, reports that the Japanese are beginning to shop for third quarter scrap have bolstered the dealers' outlook.

There are only a few scattered price changes, but they are all on the upward side. This indicates the market is firm and, perhaps, poised for the next move.

Strength is definitely reported in the Detroit, Pittsburgh, Chicago, Cleveland and Cincinnati markets this week. Firmness also appears in Philadelphia and New York.

On the basis of the stable prices, The IRON AGE composite price for No. 1 heavy melting scrap and No. 2 bundles remains unchanged for the third straight week.

Pittsburgh—The market is responding again to strength in other districts. Prices to the west are pulling a small amount of scrap from Pittsburgh. A mill in one bordering district has raised its price for No. 1 heavy melting by $2. There are reports of renewed export activity. These developments bring predictions that the next local buys will be at slightly higher prices. However, the local improvement so far is largely a matter of sentiment. Users of openhearth scrap have not raised their prices or increased volume. There are still no signs that the largest consumers will be coming into the market soon. Brokers say no scrap is moving out of the district for export.

Chicago—The market continues to inch upward, with scrap tightening. News that Japanese buyers are again active put upward pressure on weak West Europe export prices. Small carload lot sales at sacrifice prices began drying up early last week. Yards are again building inventories. Domestic buyers continue to resist any upward price movement. But broker's buying prices were forced higher to fill several expiring orders.

Philadelphia—Export activity is still the sustaining force in this market. But mill activity is beginning to pick up and most scrapmen anticipate additional domestic buys. One broker in the area says the outlook is "definitely brighter." If anything, the market is a little firmer than last week.

New York—The market is unchanged this week. This includes both prices and the general tone. Dealers are still busy filling old orders. They are hoping new orders will start picking up soon.

Detroit — There's a feeling of strength in this market. But there's nothing tangible on which to base this feeling. Dealers are not interested in selling at the same price as the start of the month. They expect a price rise on June's industrial lists. Brokers won't say whether or not they'll buy big. Reports call for one area consumer to buy June tonnage; others will be out of the market. Ford Motor Co. is advertising bundles.

Cleveland—Prices are unchanged as brokers and consumers wait for industrial lists to indicate the extent of the market rebound. The recent increase in Valley prices suggests a rising trend. There is general optimism. But there has been no new activity to establish higher prices.

Cincinnati — The market here continues to show signs of market strength but new buys are not expected until after the auto lists close. Outlook is for higher prices and increased volume.

St. Louis—There is a feeling that prices have reached the bottom. Dealers are holding on to scrap in anticipation of higher levels. Mill activity is expected to increase soon and there are feelers out for export.

Birmingham—Increased demand for foundry scrap is apparent. Quotations remain firm. But no major tonnage is really moving yet. Most brokers report there is still strong dealer resistance to the prices offered by the mills.

Buffalo—Prices remain unchanged in a very quiet market. Activity is limited to shipments of orders placed earlier this month.

Boston—Both export and domestic activity have become very slow. Hence, there are no strong buys and no price changes.

West Coast—The trade is patiently waiting Japanese orders for the third quarter. There is talk that the Japanese will buy substantial tonnage from West Coast ports. Meanwhile, prices remain stable.

Houston—Both the domestic and export markets have developed a watch-and-wait attitude. This is expected to last through the remainder of this month.

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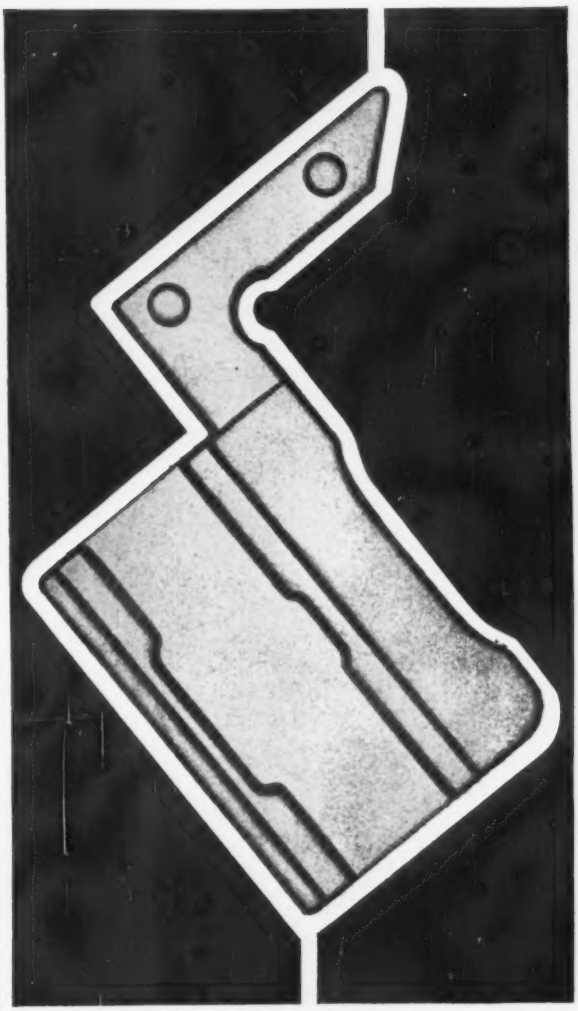

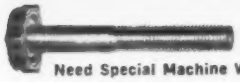

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SCRAP PRICES (Effective May 22, 1961)

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	35.00 to 36.00
No. 1 factory bundles	40.00 to 41.00
No. 2 bundles	25.00 to 26.00
No. 1 busheling	34.00 to 35.00
Machine shop turn.	14.00 to 15.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	18.00 to 19.00
Low phos. punch'gs plate	40.00 to 41.00
Heavy turnings	31.00 to 32.00
No. 1 RR hvy. melting	37.00 to 38.00
Scrap rails, random lgth.	45.00 to 46.00
Rails, 2 ft and under	49.00 to 50.00
RR specialties	41.00 to 42.00
No. 1 machinery cast.	45.00 to 46.00
Cupola cast.	37.00 to 38.00
Heavy breakable cast.	34.00 to 35.00
Stainless	
18-8 bundles and solids	180.00 to 185.00
18-8 turnings	100.00 to 110.00
430 bundles and solids	80.00 to 85.00
410 turnings	55.00 to 60.00

Chicago

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	36.50 to 37.50
No. 1 factory bundles	40.00 to 41.00
No. 2 bundles	22.00 to 23.00
No. 1 busheling	35.00 to 36.00
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Low phos. forge crops	43.00 to 44.00
Low phos. punch'gs plate, ¾ in. and heavier	42.00 to 43.00
Low phos. 2 ft and under	40.00 to 41.00
No. 1 RR hvy. melting	39.00 to 40.00
Scrap rails, random lgth.	46.00 to 47.00
Rerolling rails	57.00 to 58.00
Rails 2 ft and under	49.00 to 50.00
Angles and splice bars	44.00 to 45.00
RR steel car axles	57.00 to 58.00
RR couplers and knuckles	44.00 to 45.00
No. 1 machinery cast.	47.00 to 48.00
Cupola cast.	42.00 to 43.00
Cast iron wheels	34.00 to 35.00
Malleable	46.00 to 47.00
Stove plate	37.00 to 38.00
Steel car wheels	42.00 to 43.00
Stainless	
18-8 bundles and solids	175.00 to 180.00
18-8 turnings	100.00 to 105.00
430 bundles and solids	90.00 to 95.00
430 turnings	50.00 to 55.00

Philadelphia Area

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 dealer bundles	41.00 to 42.00
No. 2 bundles	24.00 to 25.00
No. 1 busheling	40.00 to 42.00
Machine shop turn.	13.00 to 14.00
Mixed bor. short turn.	16.00 to 17.00
Cast iron borings	14.00 to 15.00
Shoveling turnings	19.00 to 20.00
Clean cast. chem. borings	27.00 to 28.00
Low phos. 5 ft and under	42.00 to 43.00
Low phos. 2 ft punch'gs	44.00 to 45.00
Elec. furnace bundles	42.00 to 43.00
Heavy turnings	27.00 to 28.00
RR specialties	42.00 to 43.00
Rails, 18 in. and under	52.00 to 54.00
Cupola cast.	39.00 to 40.00
Heavy breakable cast.	39.00 to 40.00
Cast iron car wheels	40.50 to 41.50
Malleable	48.00 to 49.00
No. 1 machinery cast.	49.00 to 50.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	27.50 to 28.50
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	20.00 to 21.00
Machine shop turn.	10.00 to 11.00
Shoveling turnings	12.00 to 13.00
Cast iron borings	12.00 to 13.00
Low phos. 18 in. and under	37.00 to 38.00
Rails, random length	41.00 to 42.00
Rails, 18 in. and under	46.00 to 47.00
No. 1 cupola cast.	34.00 to 35.00
Heavy breakable cast.	28.00 to 29.00
Drop broken cast.	45.00 to 46.00

Youngstown

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	37.00 to 38.00
No. 2 bundles	23.00 to 24.00
Machine shop turn.	14.00 to 15.00
Shoveling turnings	17.00 to 18.00
Low phos. plate	39.00 to 40.00

Cleveland

No. 1 hvy. melting	$33.50 to $34.50
No. 2 hvy. melting	23.00 to 24.00
No. 1 dealer bundles	33.50 to 34.50
No. 1 factory bundles	37.00 to 38.00
No. 2 bundles	21.50 to 22.50
No. 1 busheling	33.50 to 34.50
Machine shop turn.	12.00 to 13.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	15.00 to 16.00
Cast iron borings	15.00 to 16.00
Cut structural & plates, 2 ft & under	37.00 to 38.00
Low phos. punch'gs plate	34.50 to 35.50
Drop forge flashings	33.50 to 34.50
Foundry steel, 2 ft & under	32.00 to 33.00
No. 1 RR hvy. melting	37.50 to 38.50
Rails 2 ft and under	48.00 to 49.00
Rails 18 in. and under	49.00 to 50.00
Steel axle turnings	26.00 to 27.00
Railroad cast.	47.00 to 48.00
No. 1 machinery cast.	47.00 to 48.00
Stove plate	38.00 to 39.00
Malleable	50.00 to 51.00
Stainless	
18-8 bundles	170.00 to 175.00
18-8 turnings	100.00 to 105.00
430 bundles	85.00 to 90.00

Buffalo

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 busheling	31.00 to 32.00
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	14.00 to 15.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	15.00 to 16.00
Low phos. plate	37.00 to 38.00
Structurals and plate, 2 ft and under	39.00 to 40.00
Scrap rails, random lgth.	38.00 to 39.00
Rails 2 ft and under	48.00 to 49.00
No. 1 machinery cast.	44.00 to 45.00
No. 1 cupola cast.	38.00 to 39.00

St. Louis

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	28.00 to 29.00
Foundry steel, 2 ft	31.00 to 32.00
No. 1 dealer bundles	34.00 to 35.00
No. 2 bundles	23.00 to 24.00
Machine shop turn.	12.50 to 13.50
Shoveling turnings	14.50 to 15.50
Cast iron borings	21.00 to 22.00
No. 1 RR hvy. melting	36.00 to 37.00
Rails, random lengths	39.00 to 40.00
Rails, 18 in. and under	43.00 to 44.00
RR specialties	39.00 to 40.00
Cupola cast.	38.00 to 39.00
Heavy breakable cast.	32.00 to 33.00
Stove plate	32.00 to 33.00
Cast iron car wheels	34.00 to 35.00
Rerolling rails	54.00 to 55.00
Unstripped motor blocks	34.00 to 35.00

Birmingham

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 dealer bundles	33.00 to 34.00
No. 2 bundles	18.00 to 19.00
No. 1 busheling	36.00 to 37.00
Machine shop turn.	18.00 to 19.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	10.00 to 11.00
Electric furnace bundles	35.00 to 36.00
Elec. furnace, 3 ft & under	34.00 to 35.00
Bar crops and plate	43.00 to 44.00
Structural and plate, 2 ft	42.00 to 43.00
No. 1 RR hvy. melting	36.00 to 37.00
Scrap rail, random lgth.	40.00 to 41.00
Rails, 18 in. and under	45.00 to 46.00
Angles and splice bars	43.00 to 44.00
No. 1 cupola cast.	42.00 to 43.00
Stove plate	42.00 to 43.00
Cast iron car wheels	35.00 to 36.00
Unstripped motor blocks	31.00 to 32.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	24.00 to 25.00
No. 2 dealer bundles	18.00 to 19.00
Machine shop turnings	5.00 to 6.00
Mixed bor. and turn.	5.00 to 6.00
Shoveling turnings	7.00 to 8.00
Clean cast. chem. borings	20.00 to 21.00
No. 1 machinery cast.	38.00 to 39.00
Mixed yard cast.	34.00 to 35.00
Heavy breakable cast.	32.00 to 33.00
Stainless	
18-8 prepared solids	160.00 to 165.00
18-8 turnings	80.00 to 85.00
430 prepared solids	70.00 to 75.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	33.00 to 34.00
No. 2 bundles	20.00 to 21.00
No. 1 busheling	29.00 to 30.00
Drop forge flashings	28.00 to 29.00
Machine shop turn.	9.00 to 10.00
Mixed bor. and turn.	11.00 to 12.00
Shoveling turnings	12.00 to 13.00
Cast iron borings	11.00 to 12.00
Heavy breakable cast.	28.00 to 29.00
Mixed cupola cast.	31.00 to 32.00
Automotive cast.	39.00 to 40.00
Stainless	
18-8 bundles and solids	170.00 to 175.00
18-8 turnings	70.00 to 75.00
430 bundles and solids	70.00 to 75.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$29.50 to $30.50
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	29.00 to 30.00
No. 2 bundles	16.00 to 17.00
No. 1 busheling	29.00 to 30.00
Machine shop turn.	4.00 to 4.50
Shoveling turnings	8.50 to 9.00
Clean cast. chem. borings	15.50 to 16.50
No. 1 machinery cast.	39.00 to 40.00
Mixed cupola cast.	32.00 to 32.50
Heavy breakable cast.	28.00 to 28.50

San Francisco

No. 1 hvy. melting		$41.00
No. 2 hvy. melting		38.00
No. 1 dealer bundles		28.00
No. 2 bundles		25.00
Machine shop turn.		13.00
Cast iron borings		15.00
No. 1 cupola cast.	$45.00 to	46.00

Los Angeles

No. 1 hvy. melting		$40.00
No. 2 hvy. melting		37.00
No. 1 dealer bundles		29.00
No. 2 bundles	$25.00 to	$26.00
Machine shop turn.		15.00
Shoveling turnings		15.00
Cast iron borings		15.00
Elec. furnace 1 ft and under (foundry)	48.00 to	50.00
No. 1 cupola cast.		46.00

Seattle

No. 1 hvy. melting	$42.00
No. 2 hvy. melting	38.00
No. 2 bundles	25.00
No. 1 cupola cast.	36.00
Mixed yard cast.	31.00

Hamilton, Ont.

Brokers buying prices per net ton on cars:

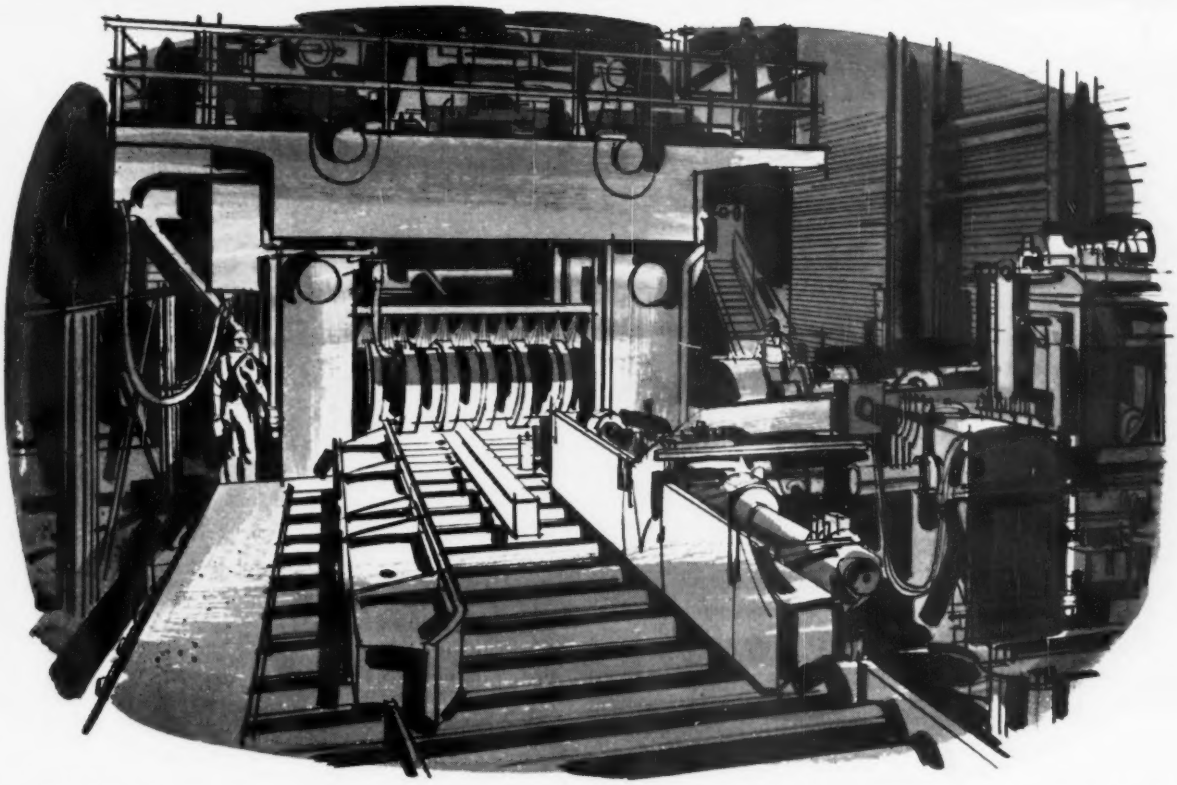
No. 1 hvy. melting	$31.00
No. 2 hvy. melting cut 3 ft and under	28.00
No. 1 dealer bundles	31.00
No. 2 bundles	21.00
Mixed steel scrap	23.00
Bush., new fact., prep'd	31.00
Bush., new fact., unprep'd	25.00
Machine shop turn.	8.00
Short steel turn.	12.00
Mixed bor. and turn.	12.00
Cast scrap	32.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$35.00
No. 2 hvy. melting	31.00
No. 2 bundles	24.00
Machine shop turn.	8.00
Shoveling turnings	11.00
Cut structural plate 2 ft & under	$45.00 to 46.00
Unstripped motor blocks	29.00 to 30.00
Cupola cast.	35.00 to 36.00
Heavy breakable cast.	29.00 to 30.00

DANGEROUS INTRUDERS IN IRON AND STEEL SCRAP



SULPHUR . . . FRIEND OR FOE?

Sulphur is an element of several faces. As a sulphuric acid compound it occupies an important place in the steel industry where it is used for cleaning metal, the recovery of ammonia products from gas and in making chemical analyses.

As an element in the composition of steel, however, sulphur is welcome only for the free machining properties it brings to certain grades. A small percentage can more than double the speed and ease with which steel bars can be machined into gears, screws, bolts, and other small parts. There is even a free machining type of stainless steel. In these instances, sulphur serves the steel industry as a friend.

But, sulphur can be an enemy as well when it appears in the steelmaking furnace as an unknown residual element.

Sulphur makes steel hot short, meaning that it cracks and tears in rolling or forging processes. It can ruin a heat of stainless steel when its presence is unknown. Therefore, scrap, high in sulphur content, unless it is properly segregated, must be considered a foe.

For scrap of known analysis, our personnel, equipment and strategically located facilities are specifically geared for the purchase or sale of dependably segregated metals. We welcome your inquiry.

Luria Brothers and Company, Inc.

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Aluminum Comeback: Steady but Slight

Steady gains have been recorded by the aluminum industry since February.

But some aluminum men are disappointed. The improvement isn't as sharp as was hoped for, trailing steel's surge.

■ Some aluminum men are wondering when the surge in steel business is going to reach aluminum.

Aluminum has been picking up. And most of the top sellers say the pickup has been noticeable.

But neither aluminum shipments nor new orders are improving as much as steel. In fact, they are not improving as much as many sellers had expected.

March Gains — March sales topped January and February levels notably.

Many in the industry thought that was the start of a sales spurt. It wasn't.

April topped March, and it looks like May will top April. But the improvement definitely has not been sharp, though it has been steady.

Top Marks—The brightest spot in aluminum orders in the last month or so has been the obvious increased buying by auto, building and appliance makers.

In March, when the industry started moving off bottom, these markets were improving much more slowly than the average. Now they are moving much faster

One major seller reports these markets pretty well accounted for the improvement in April business over March, and May over April. Other markets are just creeping up, he notes.

Still Hopeful—Despite the disappointing rate of improvement to date, the aluminum industry has not lost its characteristic optimism. One indication: Kaiser Aluminum & Chemical Corp. is starting up seven potlines. This will put Kaiser over 80 pct of capacity when they are in full operation.

Kaiser had cut back its output much further than the rest of the industry during the 1960 recession. So any business gains had to mean more potlines on stream.

Not Unhappy — One aluminum seller admits shipments and new orders could be better. But he insists he is not really disappointed at the current rate.

Another, who acknowledges steel is having a better surge of new business than aluminum right now, points out the steel industry was hit harder than aluminum by the recession and is still operating well under aluminum's percent of capacity.

Despite apprehension, it would be wrong to think aluminum makers have turned pessimistic. They still think 1961 business will top 1960, though at this point no one will predict by how much.

Tin

A Washington source says the 3933 long tons of tin in the government's special tin inventory may come on the market shortly.

The stock is controlled by OCDM and needs no Congressional or executive approval to be sold.

This source says OCDM will not turn the metal loose unless it is convinced there is a real shortage in the U. S. The price is bouncing around at a very high level. But the feeling is that part of this is because of speculators in the market, and part in anticipation of a possible shortage. There is no real shortage of spot metal yet.

Copper

Clyde E. Weed, chairman, Anaconda Co., told stockholders at the annual meeting last week that the long range picture for copper is favorable, and that "the current price ranges will probably at least hold their present level in 1961."

Lead-Zinc Aid

The Kennedy Administration's position on what aid should be given the faltering U.S. Lead-zinc industry is expected shortly.

Congressional thinking on lead-zinc aid is split. Some Congressmen seek a straight subsidy payment to small producers of lead and zinc. Others want to combine subsidy payments with increased tariffs.

The administration proposal is expected to be a subsidy program without tariff changes.

Tin Prices for the Week

May 16—110.75; May 17—111.125; May 18—110.875; May 19—110.625; May 22—110.625*.
* Estimated.

Primary Prices

(cents per lb.)	current price	last price	date of change
Aluminum Ingot	26.00	24.70	12 17 59
Copper (E)	31.00	30.00	5 16 61
Copper (CS)	31.00	30.00	5 17 61
Copper (L)	31.00	30.00	5 17 61
Lead, St. L.	10.80	11.80	12 13 60
Lead, N. Y.	11.00	12.00	12 13 60
Magnesium Ingot	36.00	34.50	8 13 56
Magnesium pig	35.25	33.75	8 13 56
Nickel	74.00	84.50	12 6 56
Titanium sponge	150-160	162-182	8 1 59
Zinc, E. St. L.	11.50	12.50	1 12 61
Zinc, N. Y.	12.00	13.00	1 12 61

ALUMINUM: 99% Ingot. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic, (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. Other primary prices, pg. 143.

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.030-.038	.048-.061	.077-.096	.136-.250
1100, 3003	48.4	47.4	46.4	45.4
5052	55.8	53.0	50.8	49.2
6061-0	53.0	50.3	48.4	47.0

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	45.3-46.8	54.0-61.5
18-32	45.8-47.5	58.6-81.5
33-38	49.5-52.2	85.1-96.6
39-44	59.8-63.6	102.0-124.0

Screw Machine Stock—2011-T-3

Size*	7/32-5/16	11/32-23/32	3/4-1 1/16	1 3/32-1 1/4
Price	60.0	59.2	57.7	55.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.506	$2.013	$2.515	$3.017

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade		67.9	69.0	77.9	103.1
AZ31B Spec.		93.3	96.9	108.7	171.3
Tread Plate		70.6	71.7		
Tooling Plate	73.0				

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	138	120	138
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	130	110	126
Seamless tube	157	129	209
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	56.13	.....	53.61	57.32
Brass, Yellow	49.27	49.56	49.21	53.43
Brass, Low	52.15	52.44	52.09	56.21
Brass, Red	53.17	53.46	53.11	57.23
Brass, Naval	53.94	60.25	47.75	58.10
Muntz Metal	51.94	.....	47.25	.....
Comm. Bz.	54.73	55.02	54.67	58.34
Mang. Bz.	57.71	61.54	51.27	.....
Phos. Bz. 5%	76.97	76.72	77.47	78.90

Free Cutting Brass Rod 34.77

TITANIUM

(Base Prices f.o.b. mill)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17. Plate, HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; bar, HR or forged, commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 32.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be $65.00
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $70.00
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.70
Calcium, 99.9% small lots ..... $ 4.65
Chromium, 99.8% metallic base .... $ 1.31
Cobalt, 97-99% (per lb) ..$1.50 to $ 1.57
Germanium, per gm, f.o.b. Miami, Okla., refined ..... $29.95 to $36.95
Gold, U. S. Treas., per troy oz. $35.00
Indium, 99.9% dollars per troy oz..$ 2.25
Iridium, dollars per troy oz. ....$75 to $85
Lithium, 98% ..... $9.00 to $12.00
Magnesium sticks, 16,000 lb. 57.00
Mercury, dollars per 76-lb flask f.o.b. New York ..... $203 to $205
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz. .$24 to $26
Platinum, dollars per troy oz. .$82 to $85
Rhodium ..... $137 to $140
Silver ingots (¢ per troy oz.) 91.375
Thorium, per kg $43.00
Vanadium ..... $ 3.65
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
No. 115 ..... 32.00
No. 120 ..... 31.25
No. 123 ..... 30.50
80-10-10 ingot
No. 305 ..... 36.00
No. 315 ..... 33.75
88-10-2 ingot
No. 210 ..... 43.75
No. 215 ..... 40.50
No. 245 ..... 35.75
Yellow ingot
No. 405 ..... 27.50
Manganese bronze
No. 420 ..... 30.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max. 24.25-24.50
0.60 copper max. 24.00-24.25
Piston alloys (No. 132 type) .26.00-27.00
No. 12 alum. (No. 2 grade) ..22.75-23.25
108 alloy 23.25-23.75
195 alloy 25.75-26.75
13 alloy (0.60 copper max.) ..24.00-24.25
AXS-679 (1 pct zinc) 23.00-24.00

Steel deoxidizing aluminum notch bar granulated or shot
Grade 1—95-97½% 23.75-24.75
Grade 2—92-95% 22.50-23.50
Grade 3—90-92% 21.50-22.50
Grade 4—85-90% 21.00-22.00

SCRAP METAL

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	27	26¼
Yellow brass	20⅜	18½
Red brass	23⅞	23⅛
Comm. bronze	24¾	24
Mang. bronze	19¼	18½
Free cutting rod ends	19½	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 29½
No. 2 copper wire 27½
Light copper 25¼
*Refining brass 26¼
Copper bearing material 25¼
*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 29½
No. 2 copper wire 27½
Light copper 25¼
No. 1 composition 24½
No. 1 comp. turnings 24
Hvy yellow brass solids 19
Brass pipe 18
Radiators 20
Aluminum
Mixed old cast. ..... 12½—13
Mixed new clips ..... 14½—15
Mixed turnings, dry ..... 13½—14

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire ..... 25½—26
No. 2 copper wire ..... 24 —24½
Light copper ..... 21½—22
Auto radiators (unsweated) . 17 —17½
No. 1 composition ..... 21½—22
No. 1 composition turnings .. 20½—21
Cocks and faucets ..... 17½—18
Clean heavy yellow brass ... 14½—15
Brass pipe ..... 17½—18
New soft brass clippings .... 17¼—17¾
No. 1 brass rod turnings .... 17 —17½

Aluminum

Alum. pistons and struts .... 7 — 7½
Aluminum crankcase ..... 9½—10
1100 (2s) aluminum clippings 12¼—12¾
Old sheet and utensils ..... 9½—10
Borings and turnings ..... 4½— 5
Industrial castings ..... 10 —10½
2020 (24s) clippings ..... 11 —11½

Zinc

New zinc clippings ..... 5½— 5¾
Old zinc ..... 3½— 4
Zinc routings ..... 1¾— 2
Old die cast scrap ..... 1¾— 2

Nickel and Monel

Pure nickel clippings 52-54
Clean nickel turnings 40
Nickel anodes 52-54
Nickel rod ends 52-54
New Monel clippings 23-23.50
Clean Monel turnings 16.50-17
Old sheet Monel 22-23
Nickel silver clippings, mixed. 18
Nickel silver turnings, mixed. 15

Lead

Soft scrap lead ..... 7½ — 7¾
Battery plates (dry) ..... 3 — 3¼
Batteries, acid free ..... 2 — 2¼

Miscellaneous

Block tin ..... 81 —82
No. 1 pewter ..... 61 —62
Auto babbitt ..... 45 —46
Mixed common babbitt ..... 10 —10½
Solder joints ..... 15 —15½
Small foundry type ..... 9 — 9½
Monotype ..... 9¼— 9¾
Lino. and stereotype ..... 8½— 8¾
Electrotype ..... 8 — 8¼
Hand picked type shells .... 5¾— 6¼
Lino and stereo. dross ..... 1¾— 2¼
Electro dross ..... 2½— 3

(Effective May 22, 1961)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES, STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3,*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$99.50 *A2*	$121.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				15.90 *T8*
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*	8.10 *P2*	5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3, T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.425 *A1,T8, M8* 7.525* *M8*	7.575 *W8*		8.40 *W8, S9,13*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5*		10.75 *A5*	8.40 *J3*	15.60 *N7*
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1, P11, B9*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3, Y1*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Struthers, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*		5.50 *Y1*			5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, N. Castle, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *B4, M10* 7.525 *E3*			8.40 *S9*	15.55 *S9* 15.60 *N7*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$80.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C7,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*	$140.00 *B2*		6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, City, Ala. Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

* Electro-galvanized-plus galvanizing extras.

(Effective May 22, 1961)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled 18 ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* 1.25-lb. base box	Electro** 0.25-lb. base box	Thin 0.25 lb. coating in coils
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35c from 1.25-lb. coke base box price 0.75 lb. 0.25 lb. add 55c. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25c. **ELECTRO: 0.50-lb. add 25c; 0.75-lb. add 65c; 1.00-lb. add $1.00. Differential 1.00 lb. 0.25 lb. add 65c.		Prices are for 50 lb. base box; for 45 lb. deduct 15c; for 55 lb. add 15c; for 60 lb. add 30c.
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*				$9.10 *U1*	$6.25 *U1*
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*	6.775 *B3*		7.525 *B3*	9.275 *B3*	10.025 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	$6.25 *B3*
	Worcester, Mass.									6.70 *A5*			
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*				Holloware Enameling 29 ga.—7.85 *U1* at Gary; Pittsburgh; *J3* at Aliquippa; *W5* at Yorkville; *Y1* at Indiana Harbor; *W5* at Wheeling; 7.95 *G2* at Granite City.		
	Canton-Massillon, Dover, Canfield, Ohio			6.875 *R1, R3* 7.50 *C19**									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A3*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3*	6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, J3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1, Y1*	$6.25 *U1, I3*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.225 *E2*							
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1*†† *R3*	7.525 *R3, S1*	9.275 *R3*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.125 *U1, J3*	6.40 *A5, J3, P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	$6.25 *U1*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	$6.40 *W5*** $6.25 *W3*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*		6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2, R3*	$10.40 *T2*	$9.10 *T2*	$6.25 *T2*
	Houston, Texas									6.65 *S2*			

* Electrogalvanized sheets. ** For 55 lb.; for 60 lb. add 15¢.

†† 7.425 at Sharon; Niles is 7.225.

(Effective May 22, 1961)

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *P2*	6.375 *P2*	7.50 *P2*	7.95 *P2*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Steelton, Pa.		5.675 *B3*									
	Fairless, Pa.	5.825 *U1*	5.825 *U1*									
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7, A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3, T5*	9.025 *R3,R2, T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875 *L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,I3*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Plymouth, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8B5H2* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5,P8, H2* 9.225 *B5,P3*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5.675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, Y1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*				7.925 *N4*	5.30 *N4*			7.625 *N4*	8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Youngstown, Steubenville, O.	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1,W5, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.675 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, B5*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10*		7.825 *B2*		9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga. Jacksonville, Fla.	5.875 *A8*	5.00 *A8*									8.00 *A8* 8.35 *M4*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas, Sand Springs, Okla.	5.925 *S2*	5.675 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective May 22, 1961) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brooke Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.
B9 Barry Universal Corp., Detroit, Mich.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.
C19 Canfield Steel Co., Canfield, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N.,
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit
H2 Hercules Drawn Steel Corp,. Toledo, O.

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M10 Mill Strip Products Co., of Pa., New Castle, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Div., Bliss & Laughlin, Inc., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

STEEL SERVICE CENTER PRICES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery; Charge	Sheets: Hot-Rolled (18 ga. & hvr.)	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)††	Strip: Hot-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled (merchant)	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		9.37	10.61	11.83	10.85	9.73	9.94	9.53	13.24	.....	.....	.....	.....
Baltimore	$.10	7.87	9.71	10.16	11.35	9.70	9.95	8.65	11.80	17.48	16.48	21.58	20.83
Birmingham		8.46	10.20	10.59	9.45	8.41	8.47	8.26	13.14	16.76	16.65	.....	.....
Boston	.10	9.84	10.68	11.87	12.26	9.72	10.26	9.87	13.45	17.79	16.79	21.89	21.14
Buffalo	.15	8.70	9.45	11.40	11.15	8.80	9.30	8.90	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	9.37	10.35	10.85	11.54	9.21	9.72	9.37	10.80	17.10	16.10	21.20	20.45
Cincinnati**	.15	9.53	10.41	10.90	11.86	9.59	10.29	9.48	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	9.37[1]	10.81	11.07	11.66	9.45	10.11	9.69	11.40	17.21	16.21	21.31	20.56
Denver		11.55	12.53	13.03	13.72	11.39	11.90	11.55	12.98	.....	.....	.....	20.84
Detroit**	.15	9.63	10.61	11.20	11.91	9.58	10.29	9.68	11.16	17.38	16.38	21.48	20.73
Houston**		10.17	10.98	11.35[3]	11.73	9.41	9.81	9.58	13.10	17.50	16.55	21.55	20.85
Kansas City	.15	10.53	11.37	10.95	12.70	10.39	10.91	10.55	11.72	17.17	15.87	21.87	21.12
Los Angeles		10.35[1]	11.20	12.20	12.40	10.30	10.45	10.25	14.20	18.30	17.35	22.90	22.20
Memphis	.15	9.13	10.50	10.95	11.44	9.47	9.82	8.97	12.89	.....	.....	.....	.....
Milwaukee**	.15	9.51	10.49	10.99	11.68	9.35	9.94	9.51	11.04	17.24	16.24	21.24	20.49
New York	.10	9.77	10.23	11.45	11.56	9.61	10.30	9.84	13.35	17.50	16.50	21.60	20.85
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia	.10	9.90	10.10	10.76	11.35	9.70	9.95	9.75	12.05	17.48	16.48	21.58	20.83
Pittsburgh**	.15	9.37	10.81	11.83	11.64	9.21	9.72	9.37	11.40	17.10	16.10	21.20	20.45
Portland		9.45	11.30	12.35	12.40	10.55	11.00	9.45	16.65	18.60	17.85	22.70	22.15
San Francisco	.10	10.27	11.79[2]	11.95	11.88	10.48	10.59	10.17	15.20	18.30	17.35	22.90	22.20
Seattle		11.35	12.45	13.40	12.80	10.95	11.50	10.80	16.20	18.60	17.85	22.70	22.15
Spokane	.15	11.35	12.45	13.40	12.80	10.95	11.50	10.80	16.35	17.75	17.95	21.58	22.30
St. Louis**	.15	9.57	10.75	11.23	11.74	9.43	9.95	9.59	11.43	17.48	16.48	21.58	20.83
St. Paul	.15	9.72	10.39	11.54	11.89	9.56	10.07	9.72	11.64	.....	16.69	.....	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars, 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. **These cities are on order quantity pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—3/8" x 1"; Plate—1/4" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—5/8-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1 1/2" to 2 7/8"; cold drawn—15/16" to 2 7/8" round; Hot-rolled 4140—5/8" to 2 7/8" round, cold drawn—13/16" to 2 7/8" round.

†† 13g zinc. [1] Deduct for country delivery. [2] 15 ga. & heatier; [3] 14 ga. & lighter. [4] 10 ga. x 48 — 120.

(Effective May 22, 1961)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	73.00
Birmingham *R3*	62.00	62.50*	66.50	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Lyles, Tenn. *T3*	.....	.....	.....	.....	73.00
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.50†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Rockwood *T3*	62.00	62.50	66.50	67.00	73.00
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	71.00†
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31-0.69 pct phos. Add 50¢ per gross ton for truck loading charge.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4*, Toledo, *I4*, $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add 75¢ per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 13 pct; 13 to 13.5 pct; 13.5 to 14 pct, add $1. Add $1.00 for each 0.50 pct manganese over 1.00 pct.

† Intermediate low phos.

FASTENERS

(Base discounts, f.o.b. mill, based on latest list prices)

Hex Screws and All Bolts Including Hex & Hex, Square Machine, Carriage, Lag, Plow, Step, and Elevator

(Discount for 1 container) — Pct

Plain finish—packaged and bulk	46
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	46

Nuts: Hexagon and Square, Hex, Heavy Hex, Thick Hex & Square

(Discount for 1 container) — Pct

Plain finish—packaged and bulk	46
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	46

Hexagon Head Cap Screws—UNC or UNF Thread—Bright & High Carbon

(Discount for 1 container)

Plain finish—packaged and bulk	46
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	46

(On all the above categories add 25 pct for less than container quantities. Minimum plating charge—$10.00 per item. Price on application assembled to bolts.)

Machine Screws and Stove Bolts

(Packages—plain finish)

	Discount Screws	Bolts
Full Cartons	46	46
Machine Screws—bulk		
¼ in. diam or smaller	25,000 pcs	50
5/16, ⅜ & ½ in. diam	15,000 pcs	50

Machine Screw and Stove Bolt Nuts

(Packages—plain finish)

	Discount Hex	Square
Full Cartons	46	57
Bulk		
¼ in. diam or smaller	25,000 pcs	
5/16 or ⅜ in. diam	56	60
	15,000 pcs	
	56	60

Rivets

	Base per 100 lb
½ in. diam and larger	$12.85
	Pct Off List
7/16 in. and smaller	15

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1960 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

(Effective May 22, 1961)

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	25.00	28.25	26.00	29.50	32.00	29.50	47.50	38.00	46.50	—	19.25–21.50	—	19.75–21.75
Billets, forging	—	37.75	38.75	39.50	42.50	39.50	64.50	48.75	57.75	29.25	29.25–26.75	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	46.75	75.75	57.50	67.25	35.00	35.00–31.50	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25–31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	52.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	40.50	68.50	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	52.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	44.25	71.75	54.50	63.75	33.25	33.25–29.75	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; Vandergrift, Pa., *U1*; Washington, Pa., *W2, J2*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Detroit, *M2*; Louisville, O., *R5*.

Strip: Midland, Pa., *C11*; Waukegan, Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A3*; Bridgeville Pa., *U2*; Detroit, *M2*; Detroit, *S1*; Canton, Massillon, O., *R3*; Harrison, N. J., *D3*; Youngstown. *R5*; Sharon, Pa., *S1*; Butler, Pa., *A7*; Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13*, (25¢ per lb. higher); New Bedford, Mass., *R6* Gary, *U1*, (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7*; S. Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1, F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R5*; S. Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T5, R3*; Ft. Wayne, *I4*; Detroit, *R5*; Gary, *U1*; Owensboro, Ky., *G5*; Bridgeport, Conn., *N8*; Ambridge, Pa., *B7*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Newark, N. J. *D2*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*; Detroit, *R5*; Reading, Pa., *C2*; Bridgeport, Conn., *N8* (down to and including ¼").

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*; S. Chicago, *U1*.

Plates: Ambridge, Pa., *B7*; Baltimore, *E1*; Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*; Vandergrift, Pa., *U1*; Gary, *U1*.

Forging billets: Ambridge Pa., *B7*; Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3*; Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*; Detroit, *R5*; Munhall, Pa., S. Chicago, *U1*; Owensboro, Ky., *G5*; Bridgeport, Conn., *N8*; Reading, Pa., *C2*.

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
	Col	Col	Col	Col	Col		
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3***	173	190	...	...	190	9.00	9.675
Atlanta *A8***	173	191	...	212	197	9.00	9.75
Bartonville *K2***	175	193	183	214	199	9.10	9.85
Buffalo *W6*	.....	.....	.....	.....	.....	9.00	9.55*
Chicago *N4*	173	191	177	212	197	9.00	9.75
Chicago *R3*	.....	.....	.....	.....	.....	9.00	9.55
Chicago *W7*	173	.....	.....	.....	.....	9.00	9.55†
Cleveland *A6*	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	9.00	.....
Crawf'dav. *M4***	175	192	...	214	198	9.10	9.80
Donora Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	177	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	.....	.....	.....	.....	.....
Houston *S2**	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	175	192	...	214	198	9.10	9.80††
Johnstown *B3***	173	190	177	...	196	9.00	9.675
Joliet Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9**	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	.....	.....	.....	.....	.....	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Palmer, Mass *W6*	.....	.....	.....	.....	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	.....	213	.....	9.95	10.50
Rankin Pa. *A5*	173	187	.....	193	.....	9.00	9.55
So. Chicago *R3*	173	187	.....	193	.....	8.65	9.20
S. San Fran. *C6*	.....	.....	.....	236	.....	9.95	10.50
SparrowsPt. *B3***	175	.....	.....	215	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.65	9.20
Worcester *A5*	179	.....	.....	.....	.....	9.30	9.85
Williamsport *S5*	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 13-13.5¢ zinc. † Plus zinc extras.
‡ Wholesalers only. †† 0.115¢ zinc.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

STANDARD T. & C.	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50								
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50								
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Fontana *K1*	*6.25		*2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50								
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11.50¢ per lb.

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.6
Chicago	140.0
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

COKE

Furnace, beehive (f.o.b.)	Net-Ton
Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Chattanooga, Tenn.	30.80
Ironton, O., f.o.b.	30.50
Detroit, f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearny, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

stack-molding gives you lower-cost castings

This 2¼-pound gray iron casting is a generator part for an automotive electrical system.

COSTS were CUT by casting 60 at a time . . . 5 to a mold . . . 12 molds high.

If you have high-volume requirements for fairly flat parts . . . investigate STACK-MOLDING.

to fill your IMMEDIATE NEEDS for QUALITY PRECISION CASTINGS at LOWER COST

Contact . . .

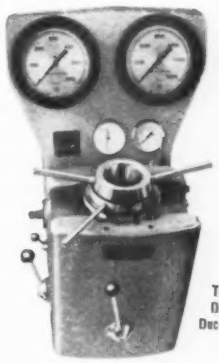
RELIABILITY . . . Uniformly high quality, with dependable composition and structure.

ACCURACY . . . Maintenance of close tolerances reduces production costs.

HIGH STRENGTH . . . Heat-treating facilities available to provide any desired properties.

OVERNIGHT DELIVERY WITHIN 500 MILES

GREAT LAKES FOUNDERS & MACHINE CORP.
LUDINGTON, MICH.
Specialists in Stack-, CO_2, and Shell-Mold Casting



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with this new Sheet Metal Tester . . .

You Run This Test . . .

Deep Draw Cupping Test

. . . and you get more usable, critical metalforming data than ever before. Find out what this new Tinius Olsen Duc✪matic Sheet Metal Tester means to you. Write for Bulletin 62. Tinius Olsen Testing Machine Company.

TINIUS ✪ OLSEN
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Willow Grove, Pa.

FERROALLOY PRICES

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 65-71% Cr, .30-1.00% max. Si.

0.02% C....	41.00	0.50% C....	33.25
0.05% C....	34.00	1.00% C....	33.00
0.10% C....	33.75	1.50% C....	32.75
0.20% C....	33.50	2.00% C....	32.50

3-5% C, 53-63% Cr, 2.5% max. Si... 26.00
4-6% C, 58-63% Cr, 3-6% Si..... 22.50
5-8% C, 58-63% Cr, 3-6% Si..... 22.50
6-8% C, 50-56% Cr, 4-7% Si..... 22.00
4.00-4.50% C, 60-70% Cr, 1.2% Si.. 28.75
0.025% C (Simplex) 31.50
0.010% C max, 63-66% Cr, 5-7% Si. 32.50
0.010% C max, 68-71% Cr, 2% Si max 31.50
0.25% C max 33.50

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

Chromium Metal

Per lb chromium, contained, packed delivered, ton lots, 97.25% min. Cr, 1% max. Fe.
0.10% max. C $1.29
9 to 11% C, 88-91% Cr, 0.75% Fe... 1.38

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (⅜" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.
Carloads $1.15
Ton lots 1.17
Less ton lots 1.19

Low Carbon Ferrochrome Silicon

(Cr 39-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in x down, packed.
Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads, bulk	22.50	14.60
Ton lots	30.45	16.05
Less ton lots	33.40	17.70

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe.
Carloads, bulk 24.00
Ton lots 27.95
Less ton lots 29.45

Calcium-Maganese—Silicon

Cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.
Carloads, bulk 22.00
Ton lots 26.15
Less ton lots 27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.
Ton lots 21.15
Less ton lots 22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.
Carload lots 18.45
Ton lots 19.95
Less ton lots 21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.
Carload bulk 19.20
Ton lots to carload packed 21.15
Less ton lots 22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn. Carload lots, bulk.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	11.00
Houston, Tex.	11.00
Johnstown, Pa.	11.00
Lynchburg, Va.	11.00
Neville Island, Pa.	11.00
Sheridan, Pa.	11.00
Philo, Ohio	11.00
Rockwood, Tenn.	11.00
S. Duquesne	11.00

Add or substract 0.1¢ for each 1 pct Mn above or below base content.
Briquets, delivered, 66 pct Mn:
Carloads, bulk 13.70
Ton lots packed in bags 16.10

Spiegeleisen

Per gross ton, lump, f.o.b., 3% Si max.

Mn	Palmerton, Pa. 10 lb, pig	35 lb, down	Neville Is., Pa. 35 lb
16-19%	.. $98.00	$96.00	$100.50
19-21%	.. 100.00	98.00	102.50
21-23%	.. 102.50	100.00	105.50

Manganese Metal

2 in. x down, cents per pound of metal delivered.
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.
Carload, packed 45.75
Ton lots 47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.
Carloads, bulk 34.25
Ton lots, palletized 36.25
250 to 1999 lb 39.00
Premium for Hydrogen - removed metal 0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 24.00

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn (Bulk)	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	31.10	33.90	35.10
0.30% max. C	29.80	32.60	33.80
0.50% max. C	28.50	31.30	32.50
0.75% max. C, 80-85% Mn, 5.0-7.0% Si	27.00	29.80	31.00

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.3¢ f.o.b. shipping point.
Carloads bulk 11.60
Ton lots, packed 13.25
Carloads, bulk, delivered, per lb of briquet 14.00
Briquets, packed pallets, 2000 lb up to carloads 16.40

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, frieght allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $92.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots,	Carloads,
98.25% Si, 0.50% Fe ..	22.95	21.65
98% Si, 1.0% Fe	21.95	20.65

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.
Carloads, bulk 8.00
Ton lots, packed 10.80

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si....	14.60	75% Si....	16.90
65% Si....	15.75	85% Si....	18.60
	90% Si....	20.00	

Ferrovanadium

50-55% V delivered, per pound, contained V, in any quantity.
Openhearth 3.20
Crucible 3.30
High speed steel 3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
100 to 1999 lb...	2.40	3.30	4.55

(Effective May 22, 1961)

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y. per lb.
Carloads, bulk ..... 9.85¢
Ton lots ..... 11.20¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.50

Ferrocolumbium, 58-62% Cb, 2 in. x D, del'd per lb con't Cb
Ton lots $3.45
Less ton lots 3.50

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta $3.40

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.76

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $5.00 unitage, per gross ton $120.00
10 tons to less carload $131.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Vanadis, O., O., freight allowed, ton lots, per lb contained Ti $1.35
Less ton lots (200 lb and up) $1.37

Ferrotitanium, 30% low carbon, 0.10% C max., 27-32% Ti, Vanadis, O., freight allowed, per lb contained Ti, ton lots $1.35
Less ton lots (200 lb and up) $1.40

Ferrotitanium, 1-3% Carbon, 17-20% Ti, f.o.b. shipping point, freight allowed, carload per net ton $250.00
Ton lots $260.00

Ferrotungsten, ½ x down packed per pounds contained W, ton lots delivered ..... $2.15 (nominal)

Molybdic oxide, briquets per lb. contained Mo, f.o.b. Langeloth, Pa. $1.49
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.38

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.
Carload, bulk lump ..... 18.50¢
Ton lots, packed lump ..... 20.50¢
Less ton lots ..... 21.00¢

Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5 .... $1.38

Zirconium silicon, per lb of alloy 35-40% del'd, carloads, bulk.. 26.25¢
12-15%, del'd lump, bulk-carloads ..... 9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload $5.50

Ferro Zirconium Boron, Zr 50% to 60%, B 0.8% to 1.0%, Si 8% max., C 8% max., Fe balance, f.o.b. Niagara Falls, New York, freight allowed, in any quantity per pound ..... 30¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ..... 18.25¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots... $1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up
10 to 14% B ..... .85
14 to 19% 1.20
19% min. B 1.50

Grainal, f.o.b. Cambridge, O., freight, allowed, 100 lb & over
No. 1 ..... $1.05
No. 79 ..... 50¢

Manganese-Boron, 75.00% Mn, 17.50% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd
Ton lots (packed) $1.46
Less ton lots (packed) 1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots 2.15

ADVERTISERS IN THIS ISSUE

An asterisk indicates that a booklet, or other information, is offered in the advertisement.

This index is published as a convenience. No liability is assumed for errors or omissions.

A

*Accurate Perforating Co. 151
Ajax-Magnethermic Corp. 12
*Allen-Bradley Co. 65-66
*Aluminium Limited Sales Inc. ... 41
Aluminum Co. of America 19-20
*American Tool Works Co. 10
Amsler Morton Co. 90
*Atlas Car & Mfg. Co. 124

B

*Babcock & Wilcox Co., Tubular Products Div. 4
Baldwin-Lima-Hamilton Corp., Standard Steel Works Div. 25-26
Belyea Co., Inc. 152
Bertsch & Co. 135
Bethlehem Steel Co. 1
Blaw-Knox Co., Foundry & Mill Machinery Div. 58
*Bliss, E. W. Co., Rolling Mill Div. 46-47
*British Cast Iron Research Association 130
*Buffalo Forge Co. 21

C

Carborundum Co. 67
Carpenter Steel Co. 54-55
Century Electric Co. 53
Columbia-Geneva Steel Div., United States Steel Corp. 61, 63, 98
Cone-Drive Gears Div., Michigan Tool Co. 131
Consumers Steel & Supply Co. ... 154
Copperweld Steel Co., Ohio Seamless Tube Div. 44-45
Crane Hoist Engineering Corp. .. 153
*Crucible Steel Co of America .. 92
*Cutler-Hammer Inc. 135

D

Dann Supply Co. 154
Detroit Steel Corp. 40
*Diamond Manufacturing Co. 130

E

Electrode Div., Great Lakes Carbon Corp. 84
Erie Equipment Co. 153
Erie Engine & Mfg. Co. 152

F

Falk Machinery Co. 154
*Farval Corp., Div. Eaton Mfg. Co. 70
*Formed Tubes Inc. 126
Foster, Frank B. Inc. 153
Frasse, Peter A. & Co., Inc. 8
Fuji Iron & Steel Co. Ltd. 57

G

*General Electric Co., Specialty Control Dept. 42-43
Gilbert Merrill Steel Corp. 154
Goss & DeLeeuw Machine Co. 151
Great Lakes Carbon Corp. 84
Great Lakes Founders & Mch. Corp. 149
*Great Lakes Steel Corp. 36-37

H

Hallden Machine Co. 35
Harbison-Walker Refractories Co. 52
Heat & Power Co., Inc. 153
Hepburn, John T., Ltd. 131
*Houghton, E. F. & Co. 64
Hughes, Arnold, Co. 154
Hyman, Joseph & Sons 153

I

Inland Steel Co. 32-33

J

Jones & Laughlin Steel Corp. ..22-23

K

Kaiser Steel Corp. 154
Kidde, Walter & Co., Inc. 129
*Kirk & Blum Mfg. Co. 31

L

Lang Machinery Co., Inc. 153
Linde Co., Div. Union Carbide Corp. 38-39
Luria Bros. & Co., Inc. 141

M

*McKay Machine Co. 94-95
*Malleable Castings Council ..116-117
*Matthews, James H., & Co. 96
Mesta Machine Co. Inside Front Cover
*Metal & Thermit Corp. 86
Michigan Tool Co., Cone-Drive Gears Div. 131
*Midvale-Heppenstall Co. 100
Milwaukee Forge & Mch. Co. 17
Minneapolis-Honeywell Regulator Co. 56
Minnesota Mining & Mfg. Co. Adhesives, Coatings & Sealers Div. 24
Minster Machine Co. 68
Morse Chain Co., Div. Borg-Warner 123, 125, 127
*Mundt, Chas. & Sons 139

N

National Steel Corp. 36-37
National Tube Div., United States Steel Corp. 61-63
Nice Ball Bearing Co. 139
*Norden Div., United Aircraft Corp. 16

O

*Ohio Crankshaft Co. 118
Ohio Seamless Tube, Div. Copperweld Steel Co. 44-45
*Olsen, Tinius, Testing Machine Co. 149
Ottemiller, Wm. H. Co. 151

P

*Pangborn Corp. 132
*Pennsylvania Flexible Metallic Tubing Co. 29
*Philadelphia Gear Corp. 6
Pittsburgh Metals Purifying Co. . 34
Pollock Industries, Inc. 152

R

*Republic Steel Corp. 48-49
Rhode Island Tool Co. 139
*Robbins & Myers Inc. 81
Roebling's, John A. Sons, Div. Colorado Fuel & Iron Corp. ... 121

S

Shell Oil Co. 14
Shenango Furnace Co. 115
*Simonds Abrasive Co. 88
Southern Screw Co. 27
Stanhope, R. C. Inc. 153
Standard Steel Works Div., Baldwin-Lima-Hamilton Corp. ... 25-26
Sun Shipbuilding & Dry Dock Co. 135
Sylvania Electric Products, Inc. ... 60

T

Tennessee Coal & Iron, Div. United States Steel Corp. 61-63, 98
*Texaco Inc. 59
*Thomas Machine Mfg. Co. 126
Tractor & Equipment Co. 154

U

Udylite Corp. 30
Ulbrich Stainless Steels 137
Union Carbide Corp., Linde Co., Div. 38-39
*United Aircraft Corp., Norden Div. 16
United Engineering & Foundry Co. 83
United States Steel Corp. ...61-63, 98
United States Steel Export Co. 61-63, 98
United States Steel Supply Div., U. S. Steel Corp. 61-63, 98
Universal Machinery & Equipment Co. 153

V

Vaughn Machinery Co. 28
*Verson Allsteel Press Co. .Back Cover

W

Wallack Bros. 154
Ward Steel Co. 82
Weiss Steel Co. Inc. 154
*Wheelabrator Corp. 18, 97
Wilson, Lee, Engineering Co., Inc. Inside Back Cover

CLASSIFIED SECTION

Clearing House 152-154
Contract Manufacturing Appears in first and third issue of each month. See June 1, 1961 issue.
Employment Exchange 154
Equipment & Materials Wanted . 154

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1	2400	GE	450	300	2300/4600
1	3000	GE	514	600	2300/4600
2	1750/2100	GE	514	250/300	2300/4600
1	1750	GE	514	600	2300/4600
1	1500	GE	720	600	6600/13200
1	1000	GE	720	275	2300/4160
1	1000	GE	900	300	4000/8000
1	1000	GE	900	600	2300/4160
1	500	GE	900	125/250	440
1	500 (New)	GE	1200	300	2300
1	500	GE	900	250	2300/4160/4160
1	300	GE	1200	275	2300/4160
1	300	GE	1200	250	440/2300
1	250	GE	900	250	440/2300
1	240	Whse.	900	125	220/440
1	200	Whse.	1200	550	2300
1	200	El. Mfg.	1200	250	2300/4800
1	150	GE	1200	275	2300
1	150	Whse.	1200	275	2300

D. C. MOTORS

Qu.	KW	Make	Type	Volts	RPM
1	3900 (New)	GE	Enc. S.V.	475	330
1	3000 (New)	Whse.	Enc. F.V.	525	600
3	2700	GE	Enc. S.V.	415	280
1	2250 (New)	GE	Enc. S.V.	600	200/300
1	2200	GE	MCF	600	400/500
3	2000	GE	Enc. S.V.	250	230/350
3	1750	GE	Enc. S.V.	250	175/350
2	1500	Whse.	New	600	300/700
4	1500	Whse.	New	525	600
1	1300	GE	MCF	300	200/400
1	1200	GE	MCF	600	450/600
1	1000	Whse.		500	800/2000
4	1000	GM	D-8	600	600/900
2	900	GE	MCF	250	180/360
1	850	GE	MCF	250	85/170
1	750	GE	MCF	600	120/360
3	750	GE	MCF	600	450/900
2	645	SS		300	1000
4	600	Whse.		250	275/550
5	400	GM	D-8	250	300/900

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Sigmund Morey: 'Man of the Year'

Sigmund Morey, Morey Machinery Co., has been named "Man of the Year" in the used tool industry.

At the NMDA convention last week in Washington, new officers were also elected.

■ Sigmund Morey, founder of the Morey Machinery Co., New York, has been named "Man of the Year" in the used machinery industry. The selection for this year was made at the 20th annual convention of the Machinery Dealers National Assn. in Washington last week.

MOREY: A top honor.

The board of directors of MDNA, in announcing the award, said Mr. Morey was selected because of his contributions in "leadership and effectiveness within the used machinery industry." This was the sixth annual "Man of the Year" award made by MDNA.

In other action at the convention, new officers were elected for the association. Those elected were: Alex Zeeve, Jr., president; Belford Small, first vice president; Joseph O'Connell, second vice president; and Richard Strom, treasurer.

Also elected were new chapter chairmen. These include: Si Mors, Chicago chapter; Nathan Herman, Cleveland chapter; Edward Johnson, Detroit chapter; Fred Burns, Jr., Milwaukee chapter; Alfred A. Caruso, New York-New England chapter; Nicholas J. Laurens, Ohio Valley-Southwest chapter; and Jack McBride, Philadelphia chapter.

Sparkman Is Hopeful On Depreciation Bill

Senator John J. Sparkman (D., Ala.), told used machinery dealers that he is "hopeful" his bill calling for new depreciation methods will make it through Congress.

The bill, proposed by Sen. Sparkman and 19 other Senators, calls for an amendment to the Internal Revenue Code of 1954 "to permit use of new methods and rates of depreciation for used property."

The Senator made his remarks at the 20th annual convention of the Machinery Dealers National Assn. in Washington last week.

He is chairman of the Senate Small Business Committee. Most of the sales of used machinery are to the smaller companies.

Mr. Sparkman said he felt the used machinery industry had a "just cause" in trying to correct the present depreciation laws. A co-sponsor of the bill is Senator George A. Smathers (D., Fla.). Sen. Smathers also has his own bill pending in Congress which attacks the depreciation problem on an even broader basis.

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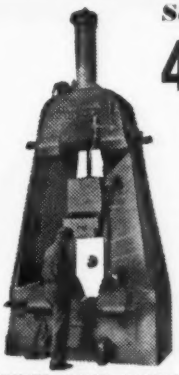

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1—25" & 42" x 68" HOT STRIP MILL, 4-high.
4—28" 2-HIGH HOT SHEET MILLS, with tables.
1—18" x 28" COLD MILL, 2-high, 200 HP drive.
1—26" COLD SHEET MILL TRAIN 5 stands.
1—12" x 16" 2-HIGH COLD MILL, 150 HP DC drive.
2—10" x 14" 2-HIGH COLD MILLS, 100 HP DC drives, with one coiler.
1—8" x 12" 2-HIGH COLD MILL, 50 HP motor.
1—3½" & 8½" x 5½" STRIP MILL, 4-high.
1—16" BAR MILL, 3-high, single stand.
1—9" BAR MILL, 3-high, five stands.
3—HOT STRIP DOWNCOILERS, for widths up to 75", max. coil diameter 54".
1—VERTICAL OPEN-SIDE BAR SHEAR, 28" knife, capacity 1" x 24" or equal.
2—SQUARING SHEARS for ¼" x 156" sheets.
2—SQUARING SHEARS for 10 ga. x 120" sheets.
4—LEVELERS for sheets, 17 rolls, widths 24", 42", 48", 66", ROLLS 4" DIAM.
1—AUTOMATIC SQUARING SHEAR UNIT for sheets, 182" side cut, 72" end cut.
1—ROLL LATHE, ENCLOSED HEADSTOCK, up to 40" dia. rolls.
1—CORRUGATING MACHINE for sheets 144" long, 9 sets of removable dies.
1—42" WIDE COIL BUILD-UP LINE.
1—POINTER, tube 2" O.D. x ¼" wall maximum.
1—1500 HP GEAR DRIVE, ratio 8 to 1.
1—1200 HP GEAR DRIVE, 295 to 30 RPM.
1—400 HP GEAR DRIVE, 8.2 to 1 ratio.
1—1500 HP MOTOR, 2300 volts, 3 phase, 60 cycle, 240 RPM.
1—4000 HP MOTOR, 2300/4600 volts, 3 phase, 60 cycle, 450 RPM.
1—175 TON HOT METAL CRANE, 54' SPAN, 4 GIRDERS.
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